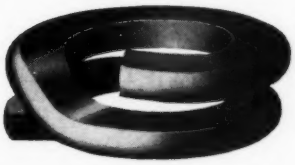
FEBRUARY, 1950

Railway Engineering and Maintenance

IMPROVED HIPOWER

SUPER HIPOWER

DOUBLE HIPOWER



THACKERY

SUPER COLLAR GROOVED

NATIONAL COLLAR GROOVED

6 MAINTENANCE COST REDUCERS

Here are six outstanding types selected from our complete line of railway spring washers. Any one will reduce maintenance cost somewhere on your road. These six meet practically every railway need —whether it be for reduction of maintenance on straightaway or tangent tracks, for frogs and crossings, for anchor screw spikes.

National's spring washers are used extensively—used by many many roads—along thousands and thousands of miles of track—on frogs and crossings throughout the world.

They have been tested, tried and found more than adequate.

If you use one or only a few of these great railway spring washers let our engineers discuss with you the other types that could further reduce your maintenance costs.

IMPROVED HIPOWERS

IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 3, N. J., U.S.A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

do this job LESS OFTEN!

save with safety

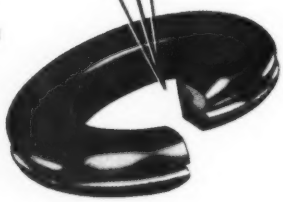
Tight rail joints are a primary essential to good track maintenance.

Reliance Xtra-hy Hy-Crome Spring Washers on track bolts require a minimum of maintenance because they are scientifically designed and fabricated to provide maximum bolt tension—to keep track bolts *tighter longer.*

Made from special cold drawn alloy steel, Reliance Xtra-hy Hy-Crome Spring Washers meet all requirements of the new A. R. E. A. specifications with a comfortable margin — do not require the use of longer bolts.

Write for complete information — or ask your nearest Eaton-Reliance office.

Edgemark of Quality



EATON

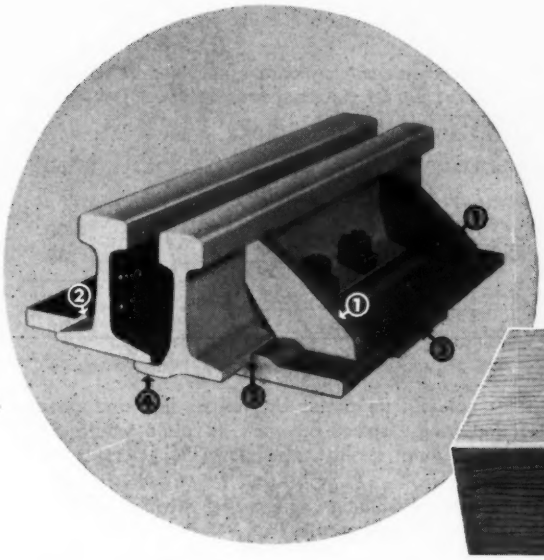
EATON MANUFACTURING COMPANY

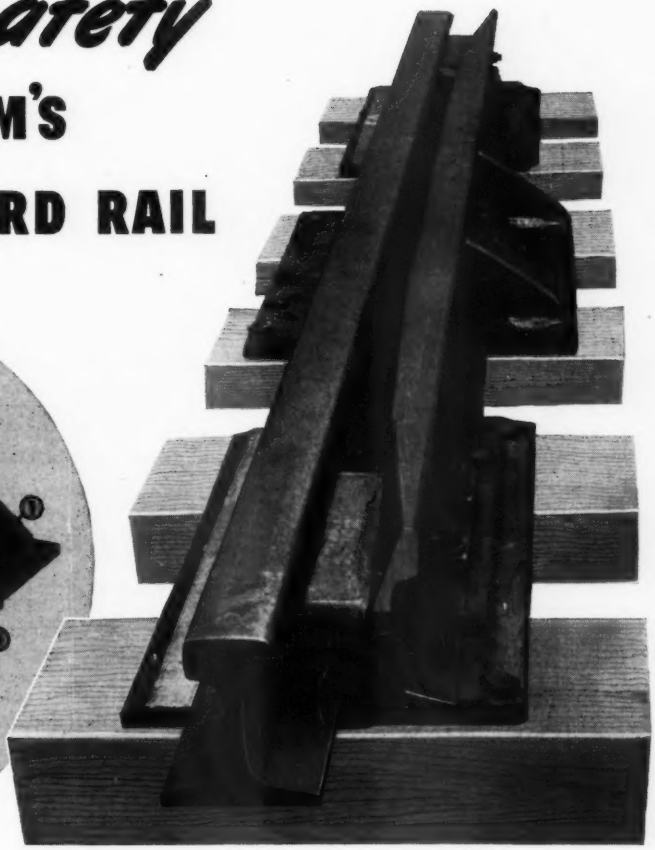
RELIANCE Xtra-hy hy-crome SPRING WASHERS

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

THERE'S *Extra Safety* IN BETHLEHEM'S HOOK-FLANGE GUARD RAIL





The Bethlehem Hook-Flange Guard Rail gives you a combination of safety features that no other guard rail possesses. Shown here is a Bethlehem Model 751, with some of its features high-lighted. Study them closely—they deserve your attention:

1. Heavy, welded side braces. For great rigidity where it is most needed—opposite the frog point.
2. Double-shoulder construction on the special tie plates in the straight guarding area. Helps maintain alignment.
3. Welded reinforcing plate. Gives extra strength and rigidness; prevents spreading; exerts clamp effect.
4. Hook flange. Dips under the running rail; hence the guard rail cannot be overturned, no matter how sharp the side thrust.

For further details, call the Bethlehem sales office nearest you. We'll be glad to tell you the whole story—and show you installations in mainline track, classification yards, and terminals.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

THE BETHLEHEM HOOK-FLANGE GUARD RAIL IS AVAILABLE IN FOUR TYPES, AS FOLLOWS:

Model 750—Without braces, for railroads preferring resiliency in a guard rail.

Model 751—Described on this page.

Model 752—A braced design with double-shouldered tie plates throughout. In this it differs from the 751, which has the double-shoulder construction only in the straight guarding area.

Model 753—Braced and adjustable type. Movable center plate permits adjustment of flangeway width.

★ BETHLEHEM STEEL ★

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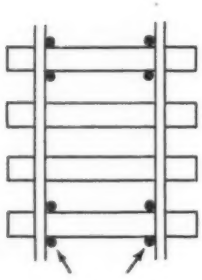
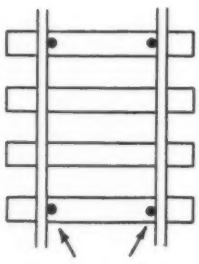
It has been frequently stated that M. of W. Departments will have to find ways and means of cutting costs. If this is accomplished, it should follow that things will have to be done differently than in the past — and new devices used.

We have the answer, where Rail Anchors are concerned!



Conventional Anchor



Our 1-piece 2-way Compression Anchor

You can SAVE *as much as* $9.12 per 39 ft. Panel of Track!

as indicated below

Comparable costs of boxing 8 ties with conventional anchors, and with NO-CREEP anchors. In each case, 8 ties per 39 ft. panel are anchored TWO ways.

Using Conventional Anchor

32 anchors, estimated cost	$9.60

Using NO-CREEP Anchor

16 anchors, cost	4.00
Plus welding (if we do welding) 2c per anchor	.32
Total cost	4.32
Savings on anchorage cost	$5.28

Plus—additional savings through elimination of maintenance

Railroads now spiking anchor holes in tie plates as well as line and gauge spiking, can eliminate line and gauge spikes on each tie plate where NO-CREEP Anchor is used. The NO-CREEP spring holds down far more than 2 standard spikes will hold.

This produces an additional saving of $3.84 in spikes and driving, based on 8 ties per 39 ft. panel of track being anchored.

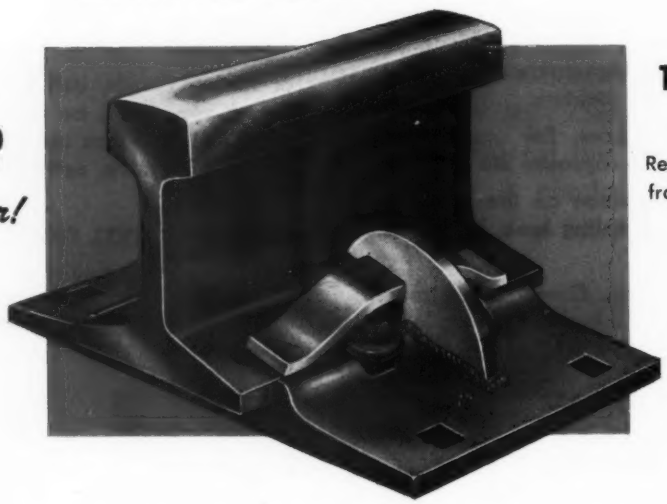
All anchors hold rails. NO-CREEP Anchor holds rails and SAVES MONEY!

Figure these savings against your track program for 1950. Also bear in mind that when using the NO-CREEP Anchors you eliminate the annual cost of resetting or adjusting anchors.

Use the

NO-CREEP

Rail Anchor!



Two-way Compression Anchorage

Remains constantly Engaged from time of Installation—Without Attention

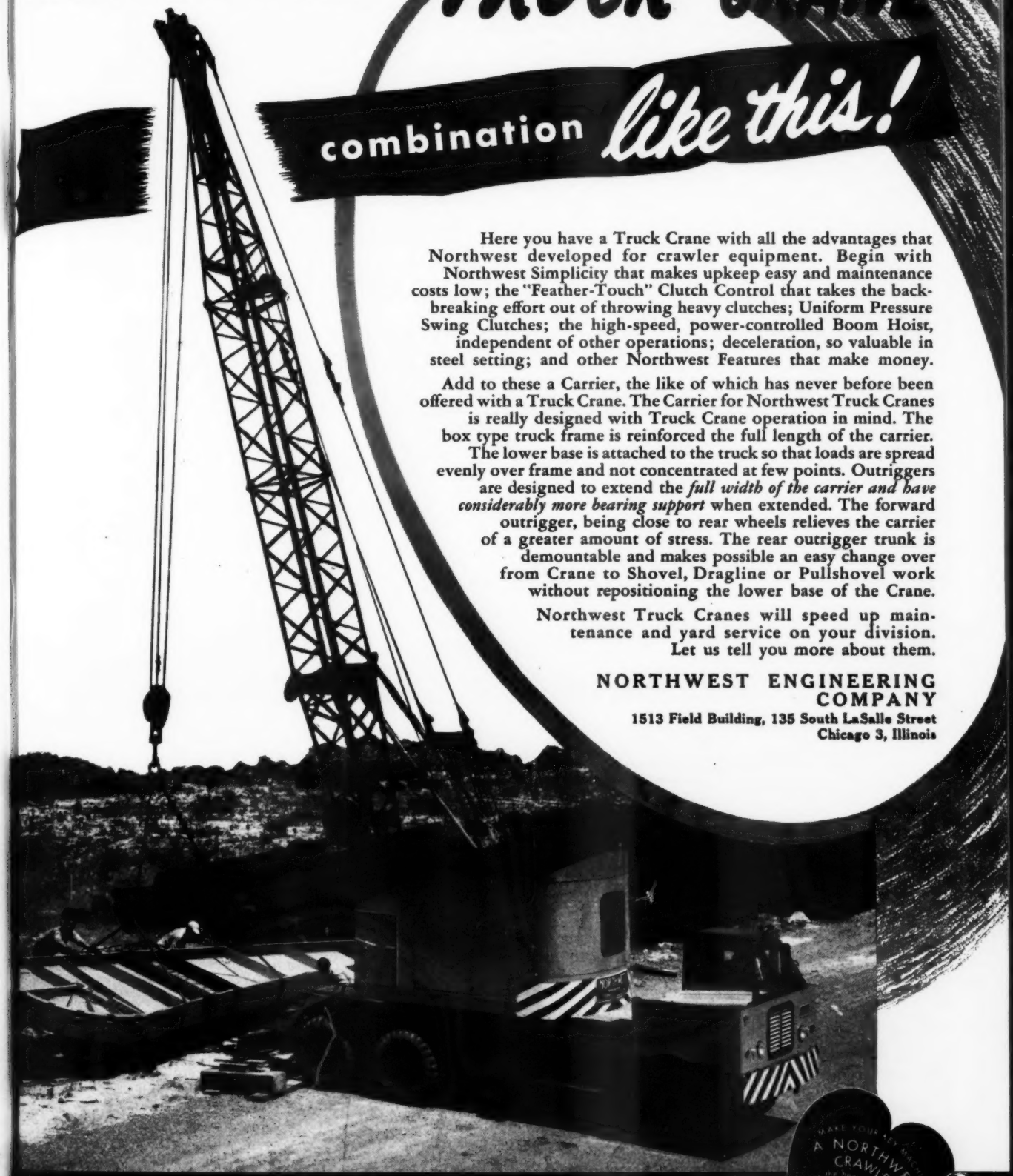
Write for details

G & H RAIL CONTROLS, INC.

Phone BE 8117 · 5204 Truman Road · Kansas City 1, Mo.

Eastern Representative: Henry A. Hillman Organization, 73 East State St., Westport, Connecticut
Southwestern Representative: Alfred Engineering and Equipment Co., 515 Cotton Exchange Bldg., Dallas 8, Texas
Western Office: Roy H. Weber Co., 68 Post St., San Francisco 4, California

There is no other TRUCK CRANE combination like this!



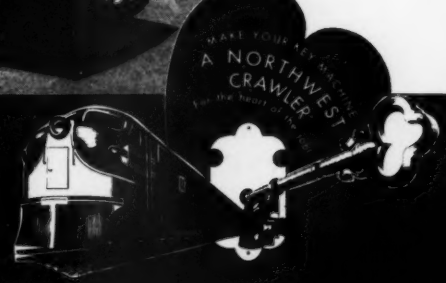
Here you have a Truck Crane with all the advantages that Northwest developed for crawler equipment. Begin with Northwest Simplicity that makes upkeep easy and maintenance costs low; the "Feather-Touch" Clutch Control that takes the back-breaking effort out of throwing heavy clutches; Uniform Pressure Swing Clutches; the high-speed, power-controlled Boom Hoist, independent of other operations; deceleration, so valuable in steel setting; and other Northwest Features that make money.

Add to these a Carrier, the like of which has never before been offered with a Truck Crane. The Carrier for Northwest Truck Cranes is really designed with Truck Crane operation in mind. The box type truck frame is reinforced the full length of the carrier. The lower base is attached to the truck so that loads are spread evenly over frame and not concentrated at few points. Outriggers are designed to extend the *full width of the carrier and have considerably more bearing support* when extended. The forward outrigger, being close to rear wheels relieves the carrier of a greater amount of stress. The rear outrigger trunk is demountable and makes possible an easy change over from Crane to Shovel, Dragline or Pullshovel work without repositioning the lower base of the Crane.

Northwest Truck Cranes will speed up maintenance and yard service on your division. Let us tell you more about them.

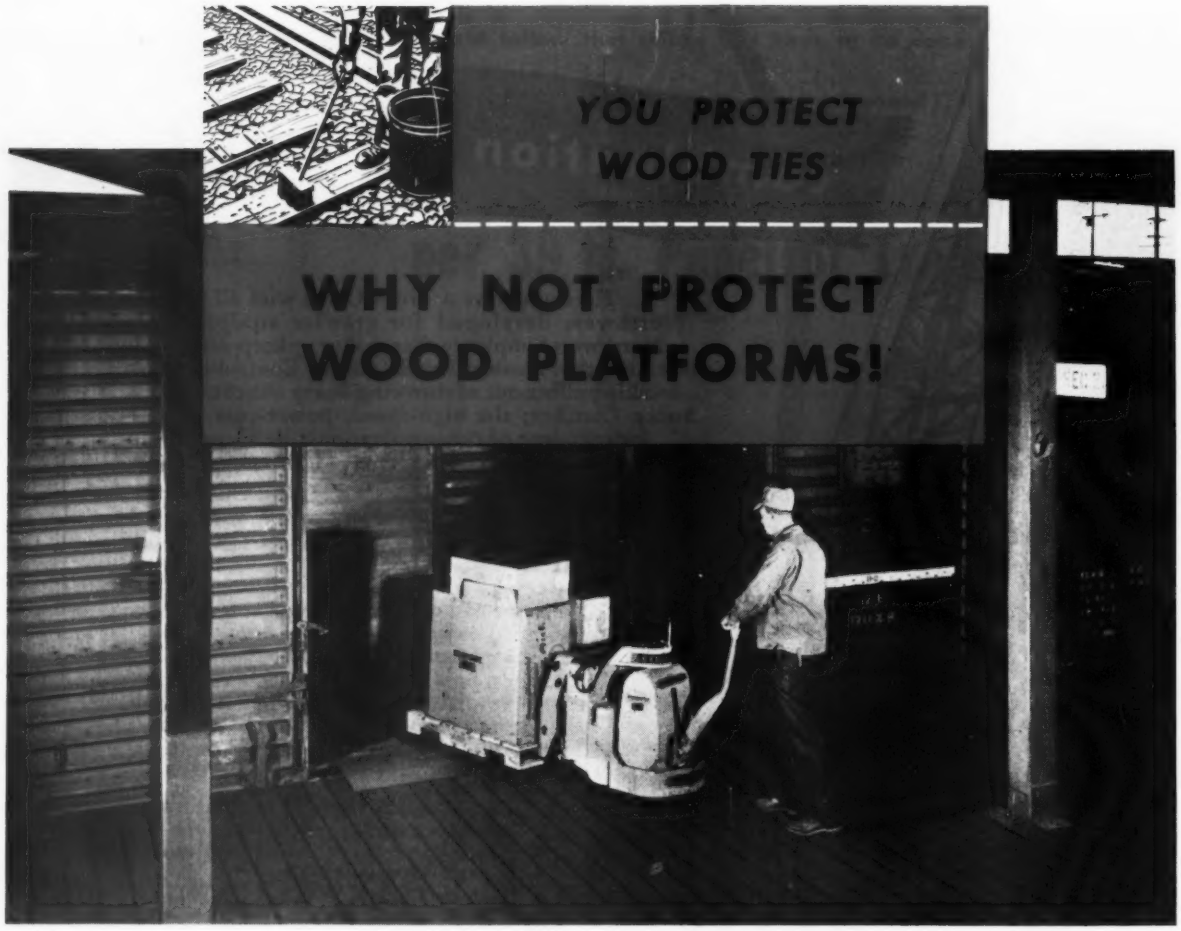
NORTHWEST ENGINEERING COMPANY

1513 Field Building, 135 South LaSalle Street
Chicago 3, Illinois



NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL



Specify penta-chlorophenol

THE CLEAN WOOD PRESERVATIVE

PENTA gives you unlimited opportunities to cut costs!

In the case of wood platforms, decay often causes considerable loss. Weakened wood increases the frequency of accidents to both men and machines. With PENTA-PROTECTED lumber, however, you have wood that resists decay and termites—lasts two and three times longer than untreated wood.

PENTA will not leach, leaves wood clean and is easy to handle. Car lumber, decking and poles should be PENTA-treated for longer life. For more information about PENTA and the part it plays in cutting railroad costs, write Dow, Dept. PE 7.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

The inset above shows newly adzed ties being treated with PENTAchlorophenol. PENTA is economical and easy to use, even in coldest weather.

DOW
penta-
chlorophenol

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Unit* TIE TAMPER

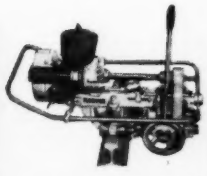
If you had an extra man working eight hours per day, you'd notice the increase in tamped track. A Racine Unit Tie Tamper provides that increase — GIVING YOU THE EQUIVALENT OF EIGHT HOURS MORE WORK EVERY DAY.

Racine Unit Tie Tampers speed up your work and increase manpower efficiency by reducing fatigue. Easily carried, easily operated, shock-free — they team up productively with your operators.

You get longer tool life with less machine maintenance, more uniformly compacted ballast that remains properly placed longer. All these are extras that make the Racine Unit Tie Tamper a valuable employee to serve you capably for a long, long time. Write for free 3-color catalog.

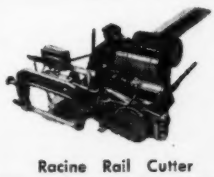
- LIGHT IN WEIGHT (60 lbs.)
- SHOCK-FREE OPERATION
- 1500 BLOWS PER MINUTE
- EASY STARTING MAGNETO IGNITION
- BALANCED RECOIL—SMOOTH ACTION
- LOW MAINTENANCE COST
- 80% IMPROVEMENT IN TOOL LIFE
- LONG TROUBLE-FREE LIFE

OTHER PORTABLE MACHINES BY RACINE



Racine Bond Drill

Racine Rail Drill



Racine Rail Cutter

RACINE

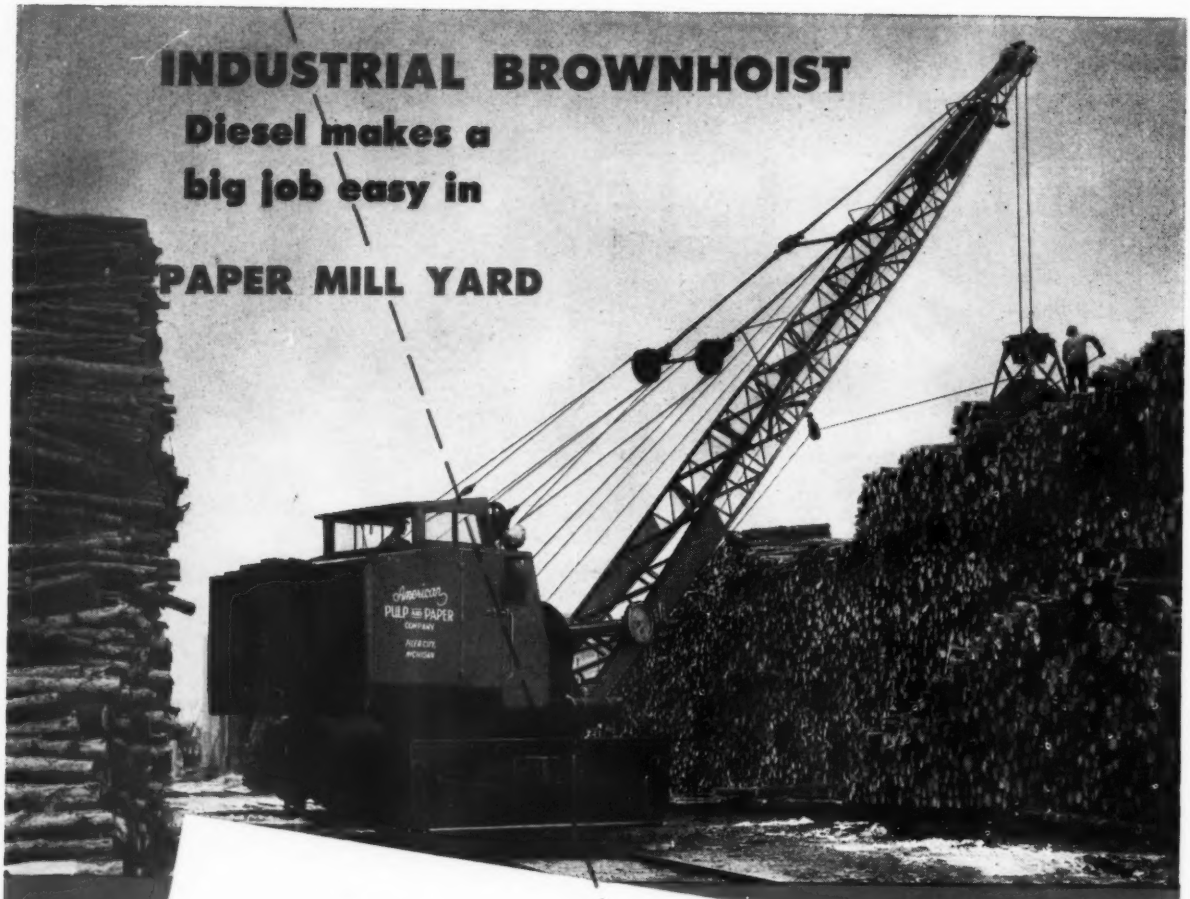
TOOL AND MACHINE COMPANY

1738 State Street, Racine, Wis.

INDUSTRIAL BROWNHOIST

Diesel makes a big job easy in

PAPER MILL YARD



THE American Box Board Company, American Pulp and Paper Division at Filer City, Michigan, makes the loading or unloading of thousands of cords of pulpwood an easy task with this INDUSTRIAL BROWNHOIST Diesel Crane. The operator enjoys full-circle 360° vision in the exclusive Monitor-type cab and Diesel motor operation *gives maximum economy with a minimum of maintenance.* On railroads, in steel mills, shipping centers, chemical plants and in the yards of scores of other industries BROWNHOIST cranes are saving time and money in the handling of materials. *Write today for complete information.*

BROWNHOIST BUILDS BETTER CRANES

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago. AGENCIES: Detroit, Birmingham, Houston, Los Angeles, Portland, San Francisco, Seattle, Spokane, Canadian Brownhoist Ltd., Montreal, Quebec.

THIS OR THIS

The Difference is $2600 a year per car!

That's a lot of difference.

Especially when you consider that it represents net savings from just *one* car in *one* type of maintenance-of-way service.

Look at it this way—

It takes time and skilled labor to unload worn-out, obsolete air dump cars or to unload gondolas with a crane. But it takes *less than a minute* for anyone to dump a fully loaded Magor Automatic Air Dump Car.

Figure that your work train costs about $200 a day. That includes time, labor and equipment. By replacing gondolas or old air dump cars with New Magor Automatic Air Dump Cars, you save at least an hour a day. That's your $2600 a year savings.

But you'll use your new Magor Air Dump Car for more than just one type of service. Probably everything from ditching to snow removal. And in every operation you are cutting time and labor costs.

Cutting work train costs is just one part of the story. Years of research, experience, field tests and top engineering skill are incorporated into the new Magor Automatic Air Dump Car. They'll operate efficiently and dependably under all conditions.

For additional information about the New Magor Automatic Air Dump Car, write for Bulletin DR-112.

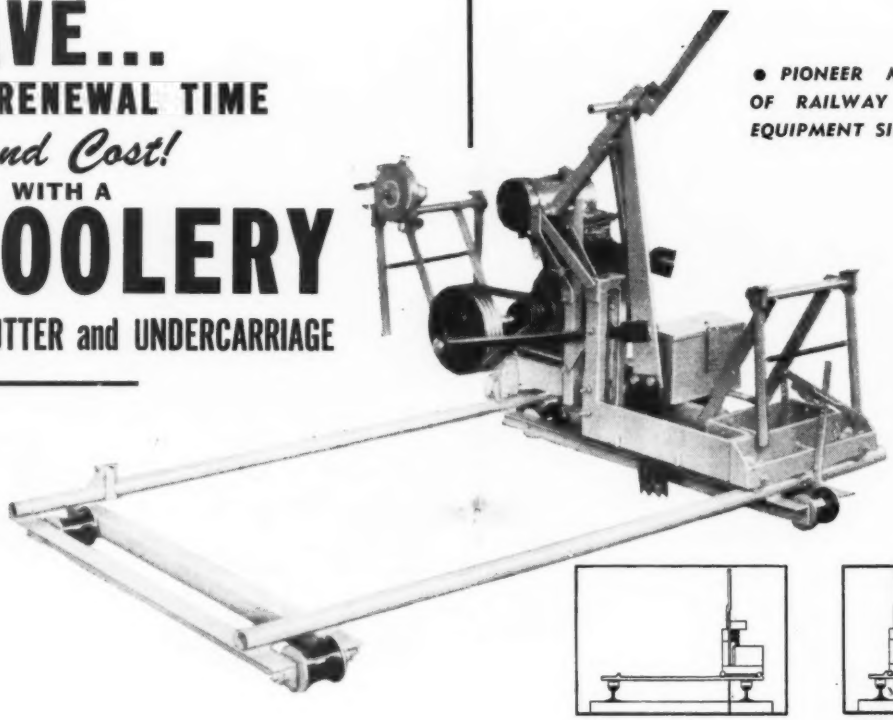
MAGOR

New Magor Cars cost less than $1.25 a day to own.

CAR CORPORATION, 50 CHURCH STREET, NEW YORK 7, N. Y.

World's Largest Producer of Air Dump Cars

SAVE...
TIE RENEWAL TIME
and Cost!
WITH A
WOOLERY
TIE CUTTER and UNDERCARRIAGE



• *PIONEER MANUFACTURERS OF RAILWAY MAINTENANCE EQUIPMENT SINCE 1917*

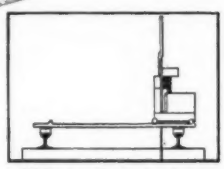


FIG. 1—tie cut at one end inside rail with Woolery tie cutter.

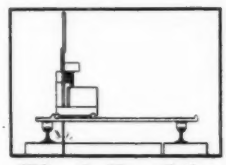


FIG. 2—Tie Cutter moved across on undercarriage for second cut on other end of same tie . . . without lifting or turning.

REPLACE MORE TIES PER DAY... AT LOWER COST!

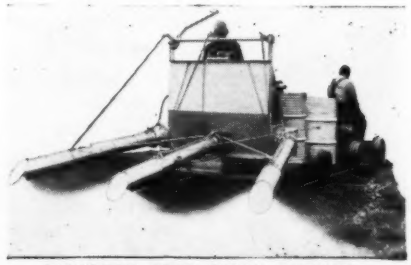
In these days of heavy high speed rail traffic, need for continuous replacement is a necessity.

With a WOOLERY Tie Cutter and Undercarriage, one man can cut tie into three sections without turning machine . . . Permits fast easy removal of old tie without disturbing ballast . . . gives new tie a firm safe bed to rest on. Entire cutting operation requires less than one minute . . . allows operator to remain just ahead of removal gang. Close cooperation in crew results in more work done per day at lower cost per tie.

MAKE A COMPARISON—see how you can reduce tie replacing costs with a WOOLERY Tie Cutter and make your maintenance dollar go farther.

WRITE FOR COMPLETE INFORMATION NOW !

WOOLERY PB-S WEED BURNER
Three burner model . . . Burns 15 ft. swath 1 trip, 25 ft. second. Enclosed cab.



WOOLERY PB-B WEED BURNER
Three burner type, trailer mounted. Burns 15 ft. swath 1 trip. Burns all types weeds.

WOOLERY MACHINE COMPANY
MINNEAPOLIS MINNESOTA
Pioneer Manufacturers of RAILWAY MAINTENANCE EQUIPMENT
RAILWAY WEED BURNERS • MOTOR CARS • FLANGEWAY CLEANERS • TIE CUTTERS • TIE PLATE SPACERS • RAIL JOINT OILERS • CREOSOTE SPRAYERS
EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENN.

Coal Tipple and conveyors, Philadelphia Reading Coal & Iron Co., covered with Alcoa Industrial Building Sheet.

TIPPLES ARE TOUGH PROVING GROUNDS

24 Years of Corrosive Coal Dust haven't damaged unpainted Alcoa Industrial Building Sheet

Subjected to weather, wear and coal dust since 1926, the Alcoa Aluminum Industrial Building Sheet covering this tipple and conveyor, still is in excellent condition, still is giving maintenance-free service, never has been painted.

Even under severe conditions you can expect similar service when you build with Alcoa Industrial Building Sheet. Only with aluminum can you get the combination of low first cost, lightness, and ease of erection combined with no painting costs and freedom from rust and corrosion.

Prove this economy yourself. Figure your next plant building in Alcoa Aluminum. For price, engineering and application data call your nearby Alcoa Sales Office, listed under Aluminum in your Classified Telephone Directory, or mail the coupon attached.

FACTS FOR BUILDING OWNERS AND MANAGERS

Low Cost — Alcoa Industrial Building Sheet is low in first cost. Can't rust away. Needs no painting.

Tough, Strong — With 4 foot purlin spacing will support 80 p. s. f. uniform load (safety factor, 2).

Light — 100 sq. ft. weigh only 56 lbs.

Available — Prompt delivery from convenient suppliers. All types of fasteners and flashing accessories in stock.

MAIL THIS COUPON TODAY • Get complete details

Aluminum Company of America
1470B Gulf Bldg., Pittsburgh 19, Pa.

Please send me engineering and application data on Alcoa Industrial Building Sheet.

Name_____

Company_____

Address_____

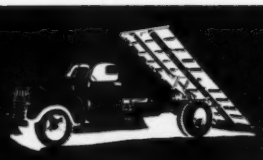
City_____ State_____

ALCOA

ALCOA ALUMINUM ®

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT-MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

A NEW *ANGLE* ON TRACK WORK



ST.PAUL *Dump* IT HOISTS

convert platform trucks into DUMPS; increase work output.

Doing a full week's track work in only 5 days puts a premium on MOBILITY and SPEED. One truck like the unit pictured here can increase the work output of several regular track crews so that a week's work will STILL GET DONE each week. Here's a few hows:

1. Reduce hazardous travel of work crews over main line trackage.
2. Less time spent delivering tools, workers and materials (including work cars) where needed.
3. Workers can be more specialized, because, being more mobile, the specialists can help out regular workers along many miles of track.
4. Addition of a DUMP IT HOIST multiplies the truck's usefulness. Hoist instantly unloads 6 to 7 tons of ties, ballast, timbers, spikes, plates, frogs, etc. Hoist also tips body for manual or winch loading of work car.

St.Paul DS (Drop-Side) body is useful for manual loading. Simple hand lever unlocks or re-locks hinged sides and tailgate. Body may be fitted with folding seats and canvas canopy.

Platform or cargo-type bodies may be fitted with canvas tops, down folding seats etc., for transporting work crews. A folding step at rear makes it easy for personnel to leave or enter.

A St.Paul DUMP IT Hoist completes the picture, making any standard truck into an all-purpose utility and maintenance DUMP unit.

1. Steel long beams furnished with hoists.
2. Low mounting for easy loading.
3. Automatic safety body lock.
4. St.Paul bronze bushing pump.
5. Safety overload valve.

USE THE COUPON... TO ORDER... TO OBTAIN LITERATURE

Recommended installation is a 12 foot DS, platform or cargo body with DUMP IT Pony Hoist on a truck with cab-to-axle dimension of approximately 84 inches. Price, DUMP IT Pony Hoist only with channel steel long-beams and all fittings, ready to install. $365.00, f.o.b. Minneapolis, not mounted.

ST.PAUL DIVISION, Gar Wood Industries, Inc.
2207 University Ave., S.E., Minneapolis 14, Minnesota

☐ Enter our order No._____ for (quantity)_____

DUMP IT Pony Hoists @ $365.00 f.o.b. Minneapolis. To fit following truck:

Make_____ Model_____

Year_____ Wheelbase_____ Cab-to-axle_____ Max. Load_____ Tons

☐ Send full information on above installation.

*Name of Company*_____

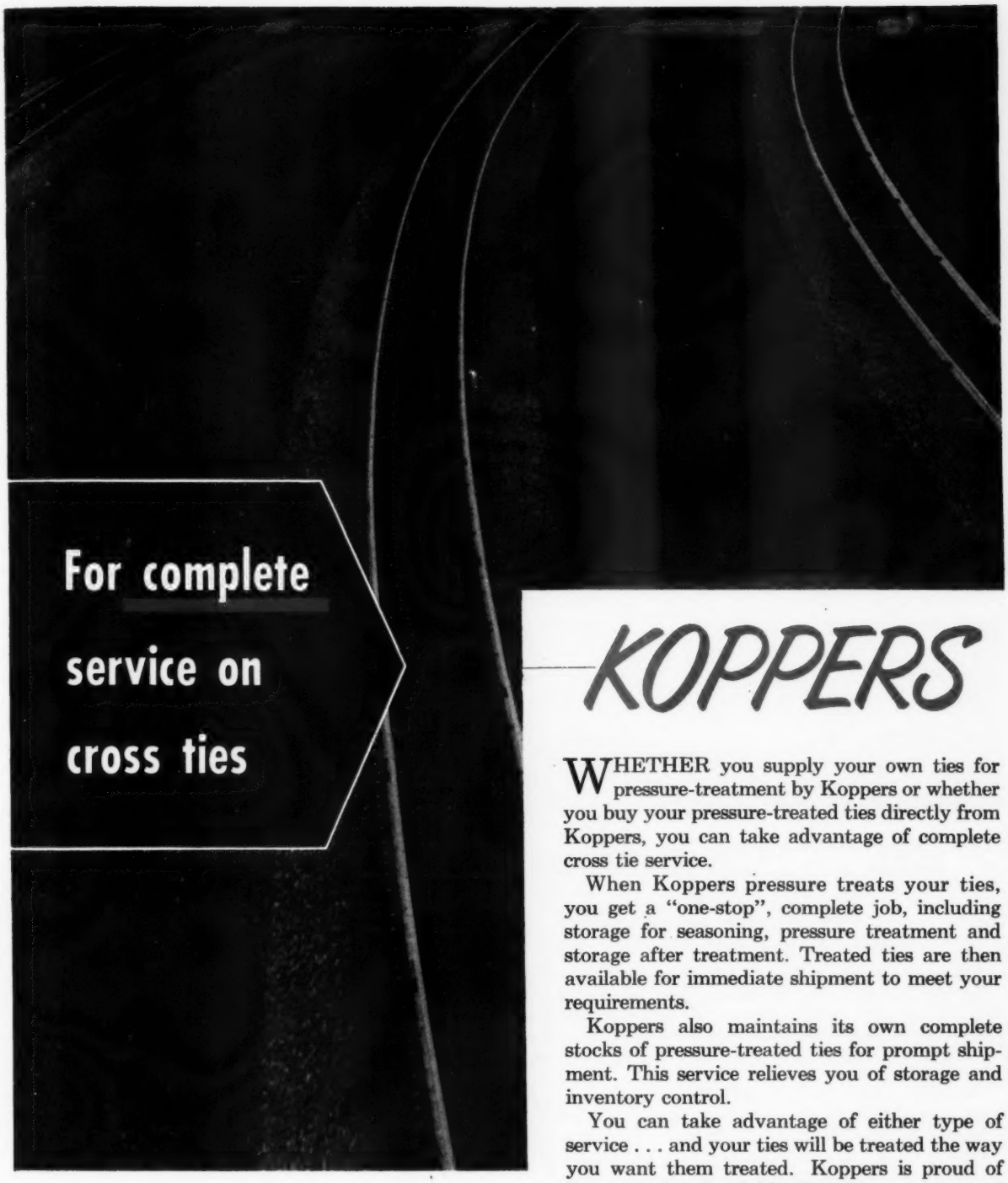
*Street and Number*_____

*City*_____ *Zone*____ *State*_____

ATTENTION MR._____ TITLE_____

ST.PAUL DIVISION
Gar Wood Industries, Inc.
2207 University Avenue, Southeast
Minneapolis 14, Minnesota

St.Paul HYDRAULIC



KOPPERS

WHETHER you supply your own ties for pressure-treatment by Koppers or whether you buy your pressure-treated ties directly from Koppers, you can take advantage of complete cross tie service.

When Koppers pressure treats your ties, you get a "one-stop", complete job, including storage for seasoning, pressure treatment and storage after treatment. Treated ties are then available for immediate shipment to meet your requirements.

Koppers also maintains its own complete stocks of pressure-treated ties for prompt shipment. This service relieves you of storage and inventory control.

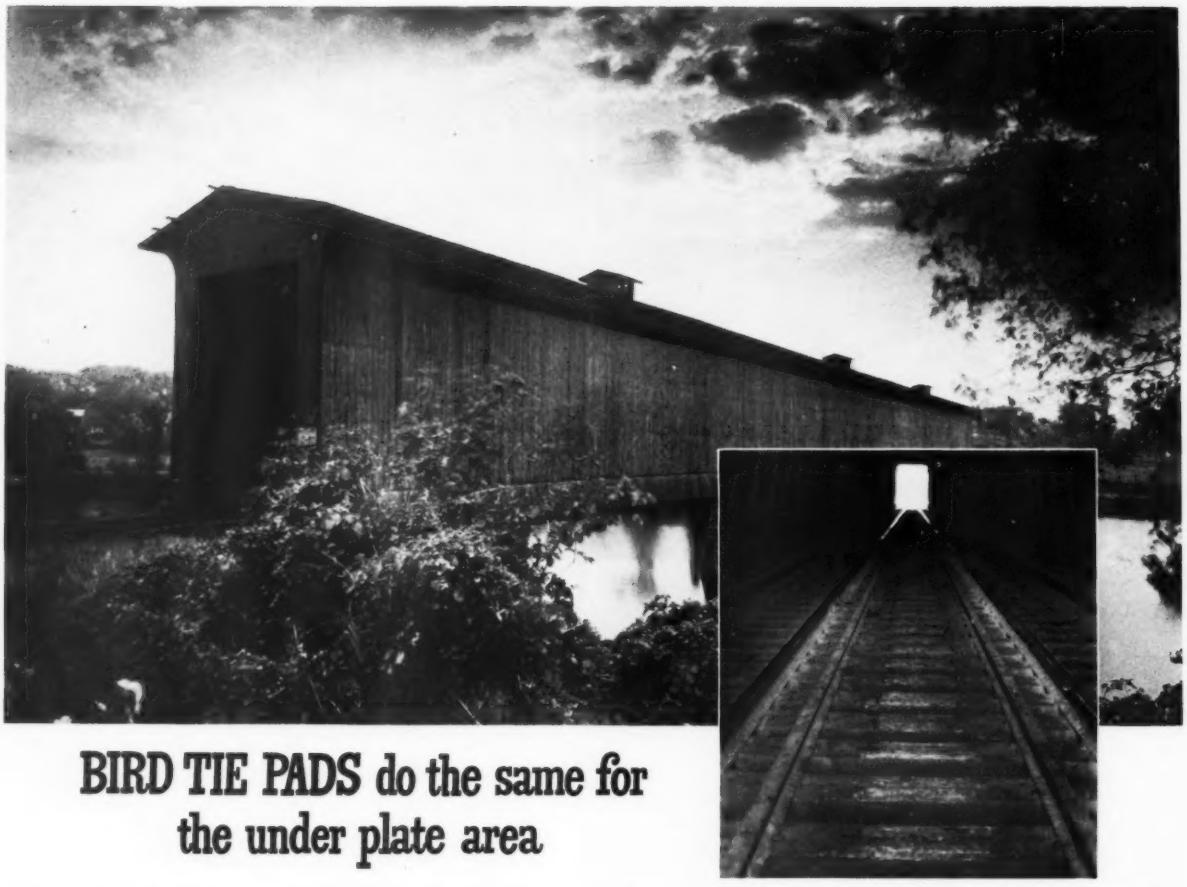
You can take advantage of either type of service . . . and your ties will be treated the way you want them treated. Koppers is proud of its reputation for rigid adherence to customers' specifications . . . that reputation is your assurance of satisfaction. Call Koppers for cross ties . . . and a service to fit your needs.

KOPPERS PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC. **Pittsburgh 19, Pa.**

51 YEAR OLD BRIDGE TIES

Still good because they are DRY on this COVERED Railroad Bridge



BIRD TIE PADS do the same for the under plate area

The above bridge on the St. Johnsbury and Lamoille County Railroad near Swanton, Vermont was built in 1898. The original *untreated fir* ties, *without tie plates,* are still in excellent condition. They are good for a great many more years of service, as shown in the close-up insert.

Light traffic? Not at all . . . heavy shipping of limestone, talc, and pulpwood results in approximately 25 year bridge tie life on this road's standard type bridges (uncovered, treated ties, and tie plates) — little longer than on the largest and heaviest tonnage American railroads.

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Bird Tie Pads protect the under plate area of ties even more effectively than this covered bridge has. The same tight tacky seal that keeps the wood dry also eliminates both plate motion and abrasives, and consequently mechanical wear. Furthermore, spike hole wood is kept dry and sound, keeping spikes tight and helping greatly in holding gauge and line. Write to address below, Dept. H, for full details.

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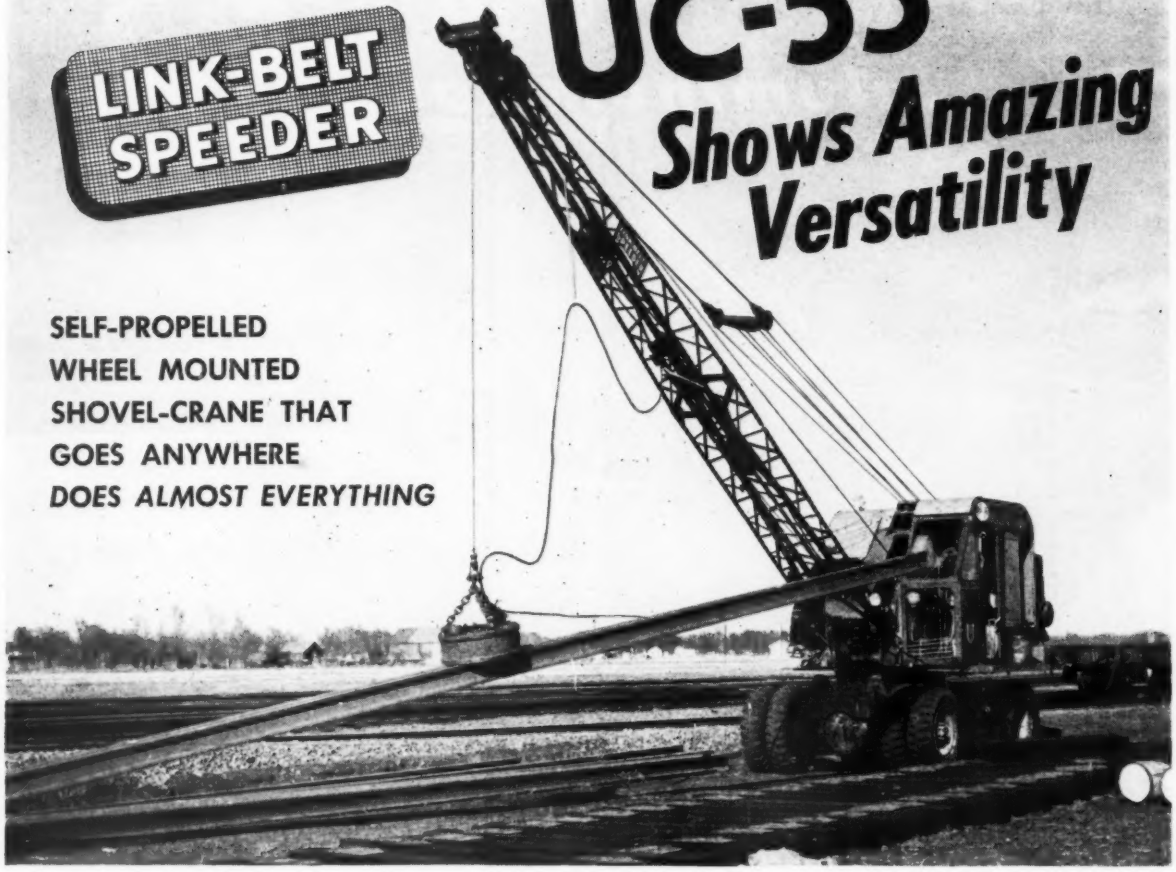

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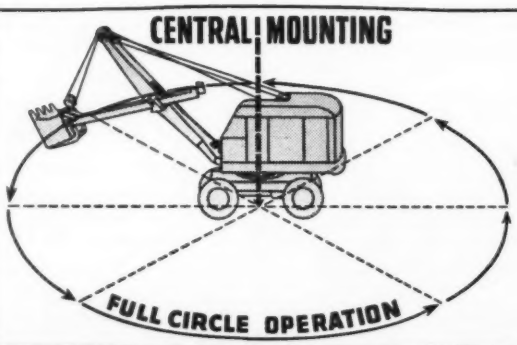

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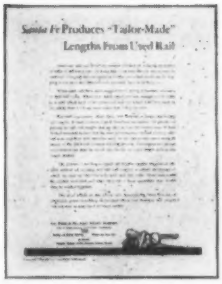
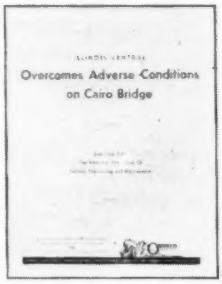


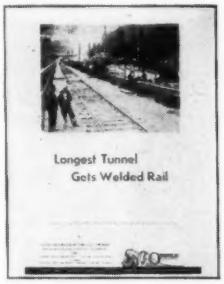
3 How "tailor-made" lengths are made from used rail.

4 How welded rail is installed by a freight road.

5 Laying continuous rail in high-speed open track.



6 How welded rail was installed on a long bridge.



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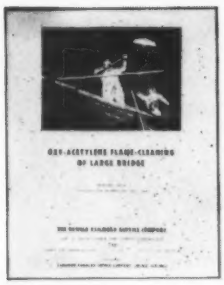

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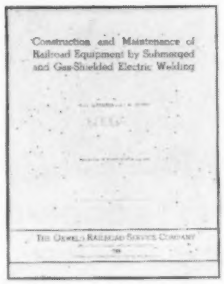

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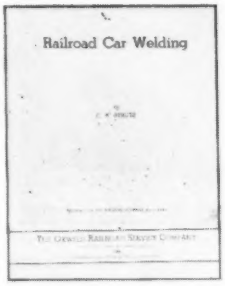

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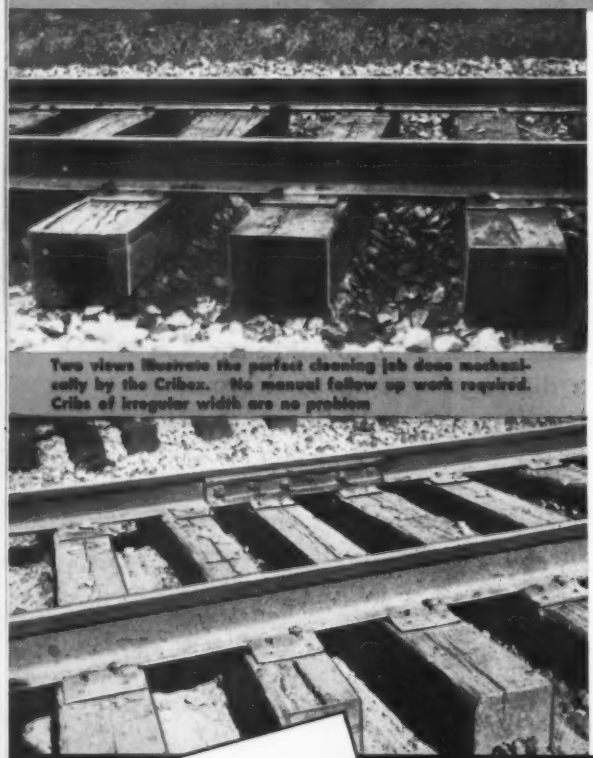

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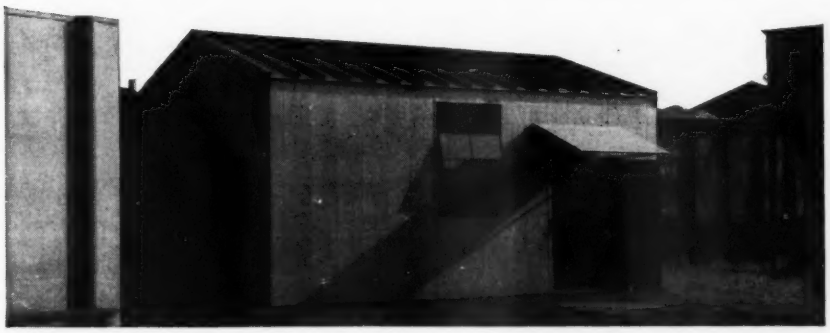

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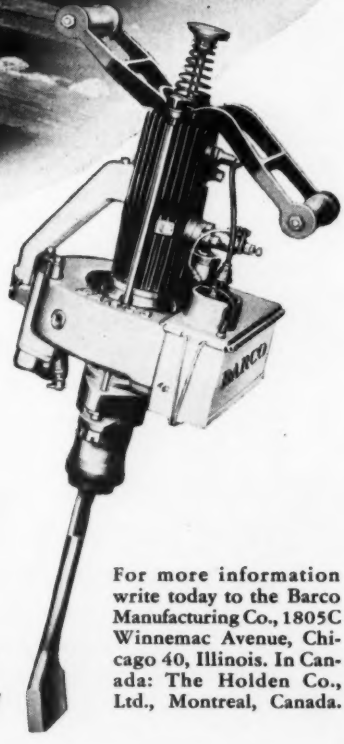

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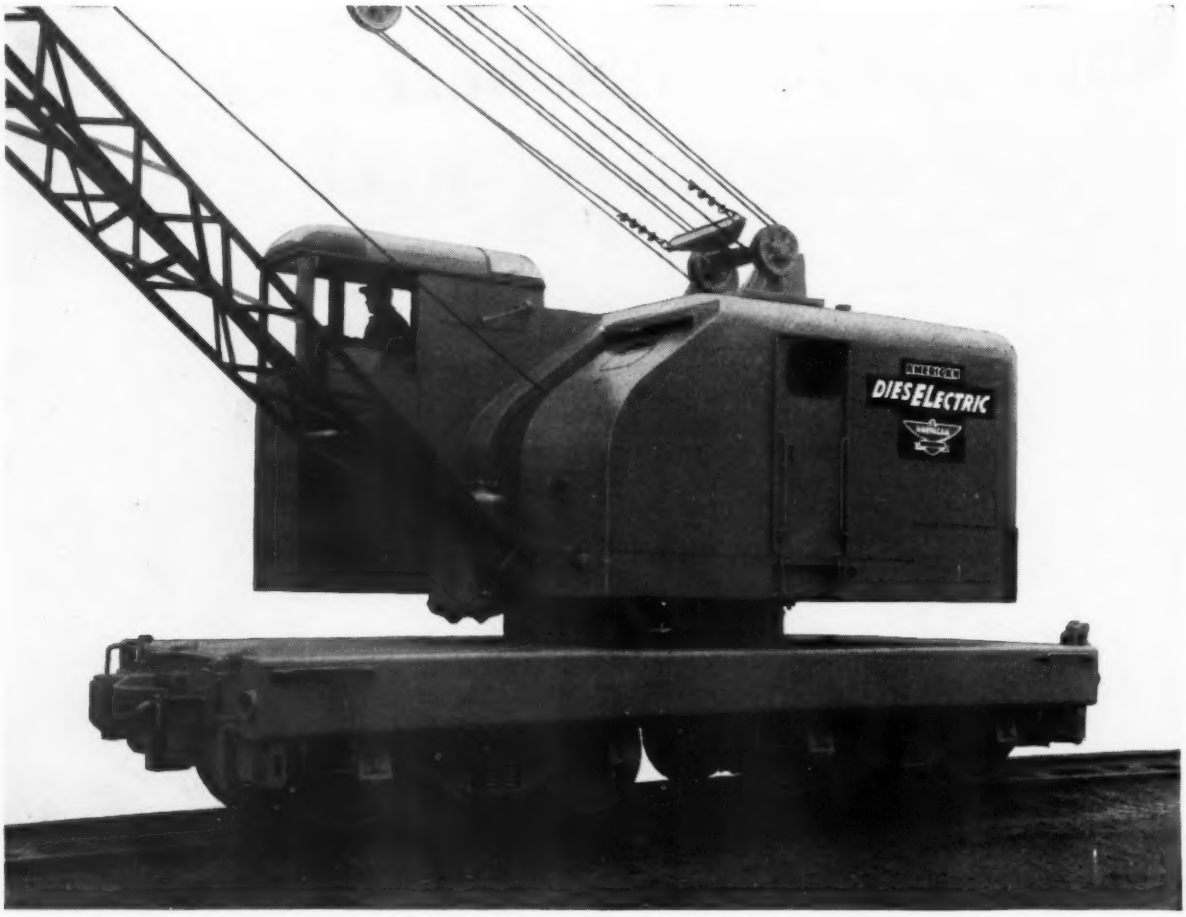

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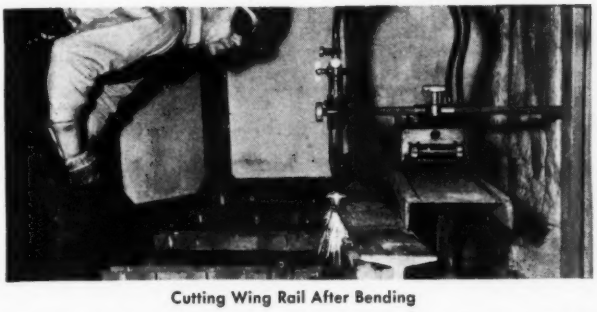
WHAT'S THE BEST WAY

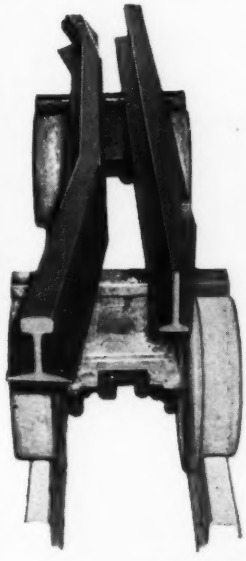
...to fabricate rigid frogs?

Heating Wing Rail for Bending Operation



Cutting Wing Rail After Bending

Cutting Long Point Rail



Both Rails After Bending, Cutting and Finishing

Use the Oxyacetylene flame processes!

Airco Railroad Service Representatives recently supervised the fabrication of rigid frogs in a large railroad shop. They observed costs and results. On the basis of this experience, they recommend:

For Bending – heat both the wing rail and the long point rail in required places with the oxyacetylene flame. This simplifies the actual bending operation – cuts time and cost.

For Cutting – make the two cuts on ball and the two on the base of long point rail with the Airco No. 10 Radiagraph (portable, oxyacetylene gas cutting machine) and using the same machine make the necessary cut on the wing rail.

This type of cutting operation was found to be far more economical and less time consuming than doing the same job by other means.

For more information about the above job and other oxyacetylene flame or arc welding applications, write your nearest Airco office.

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PENNSYLVANIA RAILROAD Uses FABREEKA On Steel Deck Bridges

Two Steel Deck Bridges at Baltimore, Maryland Equipped with Fabreeka Pads

Close-up photograph of a short section of rail on one of the single track bridges which eliminate grade crossings between Baltimore and Sparrows Point, Maryland. The lower photograph shows a length of track on the other bridge of this type in this neighborhood. It is a double track structure.

On both bridges Fabreeka Pads were installed between the steel deck and the base of the rail and also between the top of the rail base and the hold-down clips to absorb impact shocks, isolate transmitted vibration and reduce noise.

Because Fabreeka absorbs impact and isolates transmitted vibration it greatly reduces the tendency for cracks to develop in the steel decking. Its use also permits the elimination of ties which saves approximately 8" of track fill approaching the overhead type bridge. For an underpass the same saving is possible in excavation.

The isolation of rail and fastenings on deck bridges very noticeably reduces the noise of train crossings. And, the clips stay tighter longer.

Because it has limited resiliency, no permanent "set" and extremely long life Fabreeka is the ideal material to absorb impact shocks, isolate transmitted vibration and reduce noise. It is widely used in track structures at such points as crossings, turntables, track scales, in place of ties on steel and concrete deck bridges, and between bridge supports and concrete foundations.

It Pays to Specify FABREEKA

FABREEKA PRODUCTS COMPANY, INC. 222M SUMMER STREET, BOSTON 10, MASS.

JACKSON 4 Tamper OUTFITS

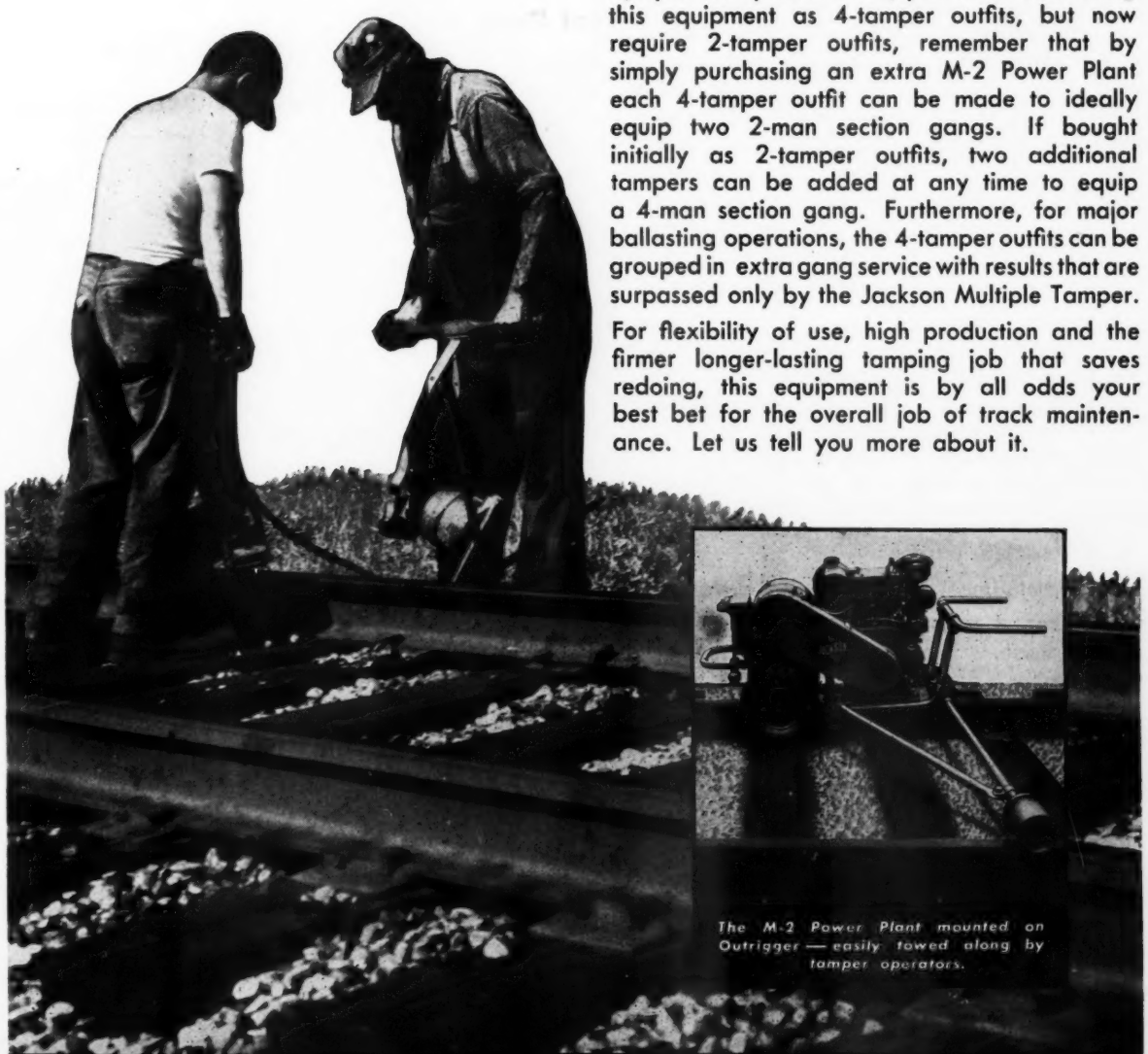
are also IDEAL For 2-MAN SECTION GANGS

TOPS FOR EXTRA GANG SERVICE, TOO!

In the reorganization of track maintenance crews to beat the 40-hour week, don't overlook the fact that with the Jackson M-2 Power Plant, which operates 1 to 4 Jackson tampers, you have the perfect nucleus for achieving the ideal tamping combination for either 2 or 4-man section gangs and extra gang service as well.

If, up to the present time, you have been using this equipment as 4-tamper outfits, but now require 2-tamper outfits, remember that by simply purchasing an extra M-2 Power Plant each 4-tamper outfit can be made to ideally equip two 2-man section gangs. If bought initially as 2-tamper outfits, two additional tampers can be added at any time to equip a 4-man section gang. Furthermore, for major ballasting operations, the 4-tamper outfits can be grouped in extra gang service with results that are surpassed only by the Jackson Multiple Tamper.

For flexibility of use, high production and the firmer longer-lasting tamping job that saves redoing, this equipment is by all odds your best bet for the overall job of track maintenance. Let us tell you more about it.



The M-2 Power Plant mounted on Outrigger — easily towed along by tamper operators.

ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Mich.

Mining Gold

FOR THE RAILROADS

When Pullman-Standard Power Track Cribbers start digging . . .

—cribs come clean in seconds . . .

—and track-maintenance costs take a nose dive.

Suppose *we* dig into just one of numerous case histories, and let the results recently reported by a leading railroad system tell their own story . . . of "gold-mining" performance by Pullman-Standard *Power Track Cribbers*.

DATA FILE "X"

CRIBBING WITH POWER TRACK CRIBBER

Type of ballast: hard, cemented rock.
Single-track operation.
Total cribs cleared: 10,108.
Cribs per minute: 1.8.
Time per crib: 32.8 seconds.
Labor cost per crib: 13.8¢.
Labor cost per mile: $430.00.

COMPARISON WITH HAND CRIBBING (estimated)

Labor cost per crib: 61.5¢.
Labor cost per mile: $2,000.00.

SAVING—MACHINE vs. HAND CRIBBING

In labor cost per mile: $1,570.00 (78%).

Mechanized track maintenance with Pullman-Standard equipment offers *proved economies*, to set against increased wages and the 40-hour week. The Pullman-Standard Power Track Cribber *alone* can effect great savings—and its teammates, the Ballast Cleaner and the Ballaster, may be used with it, in production-line sequence, to save additional costly man-hours.

These economies are *facts of record*, in instance after instance. They are worthy of the most careful consideration in any railroad's current budget planning.

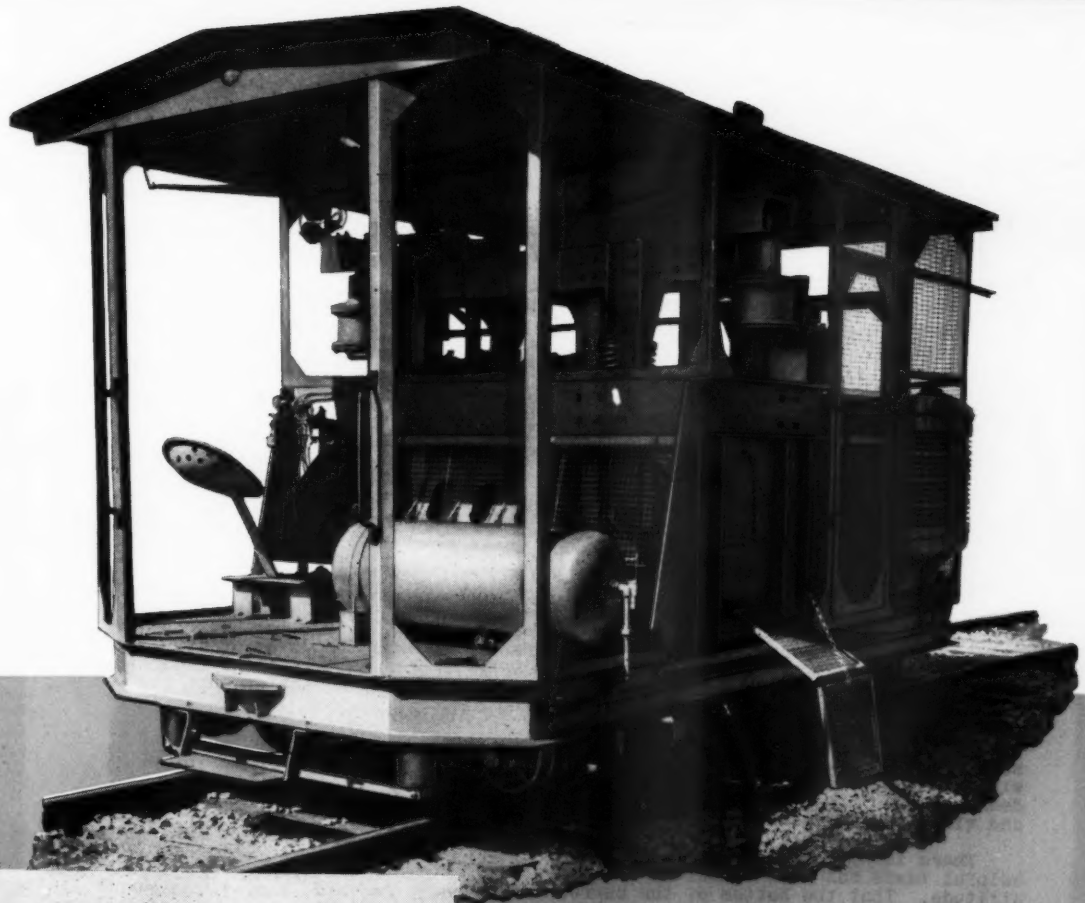
IMPORTANT NOTICE

Pullman-Standard power track maintenance machines are available to railroads in any of the following ways:

1. **By outright purchase.**
2. **On installment terms.**
3. **By rental, with option to purchase.**

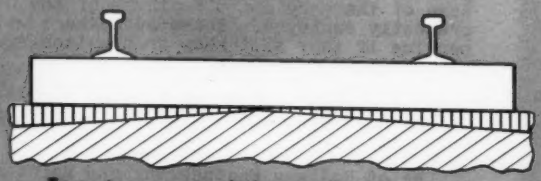
Further information will be promptly supplied.

"TRACK AT ITS LEVEL BEST" fully describes and pictures these money-saving machines. You are invited to write for a copy of this 24-page brochure.



Powered by a 100-h.p. gasoline or Diesel engine, the Pullman-Standard Power Track Cribber travels to and from location at a speed of 25 miles per hour. Power-operated jacks and transverse wheels permit complete setoff in from three to five minutes.

Railroads operating Pullman-Standard Power Track Cribbers think in terms of *mileage* instead of footage. Typical performance—1.8 cribs per minute.



To restore proper drainage, the Power Cribber cuts a uniform sloping profile between the ties, level with the tie base at the track center and 3½ inches lower at the tie ends.

Double action! While digger bars are clearing out one crib, the "pile-driver" impact bars shown at right are loosening the ballast in the crib ahead.

Pullman-Standard

CAR MANUFACTURING COMPANY

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No. 254 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W MONROE STREET
CHICAGO 3 ILL

Subject: Keep Thinking

February 1, 1950

Dear Readers:

The welfare of your industry demands more ideas from you. The progress of civilization has been based upon ideas. Individual industries have prospered or languished—even died—depending upon the degree of life that has been infused into them by ideas. Your railroads are no exception. Changing economic conditions, competition, and even social tastes and whims, are demanding constant change on the railroads to produce greater economy, improved quality and safety of service, and the lowest possible service charges. If these changes do not keep pace with or ahead of demands, your industry, no matter what its indispensability in the past, will wither and die.

You, the readers of this publication, representing a large and important segment of railroad personnel, have a vital responsibility in this battle of wits to keep your industry in the forefront—ahead of all economic and service demands. You have a responsibility to yourselves as well as to your industry, and will benefit assuredly as your industry benefits.

There is no room for the thought that "it can't be done"—that "the well of helpful ideas has been exhausted". There is no room for the "let-George-do-it" attitude. That the bottom of the barrel has not been reached, and, with constantly changing conditions and demands, never will be reached, is demonstrated conclusively in the fact that the some 36,000 employees of the Illinois Central alone have contributed more than 291,000 ideas to that road's Suggestion System since it was inaugurated in 1939, more than 50,000 of which have been adjudged worthy of adoption, and awards, by the road's management. Furthermore, whereas 49,000 suggestions were received in the first three years that the system was in effect, more than 87,000 ideas were submitted by employees during the three years ending December 31 last.

Which of you will say that the ultimate has been reached in the construction or maintenance of railway tracks, bridges, buildings or water service facilities? — that the peak of efficiency has been reached in present methods, practices or work organizations? Why, there are even those who would question some of the very basic features of the designs, methods and organizations presently employed. These and others will render the industry an invaluable service if they will keep on questioning, thinking, suggesting, until they are proved right or wrong.

Our suggestion is, let's make 1950 an "idea year". Never undertake anything, no matter how little, without first thinking, questioning—can it be done better, safer, or more efficiently?

We of Railway Engineering and Maintenance are trying constantly to give you ideas to help you in your work, and to form through our publication a place of exchange for your ideas. At the same time, we are always trying to develop new ideas to make Railway Engineering and Maintenance more helpful to you, and will always welcome your suggestions to that end. Let's do more real intensive thinking in 1950—all of us.

Sincerely,

Neal D. Howard

NDH:ag

Editor

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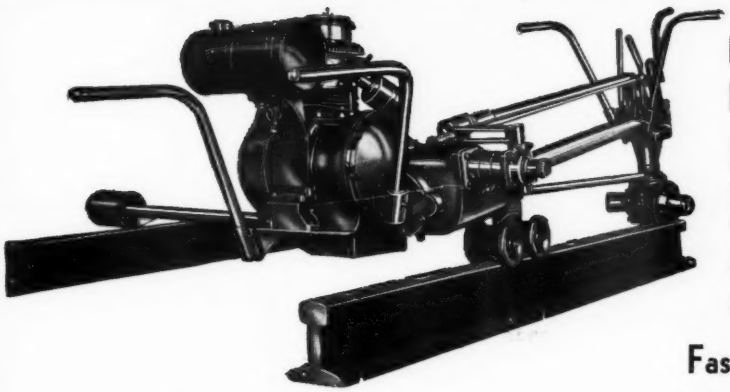

Breaks
Frozen nuts . . .
Rugged but
Light . . .
Accurate
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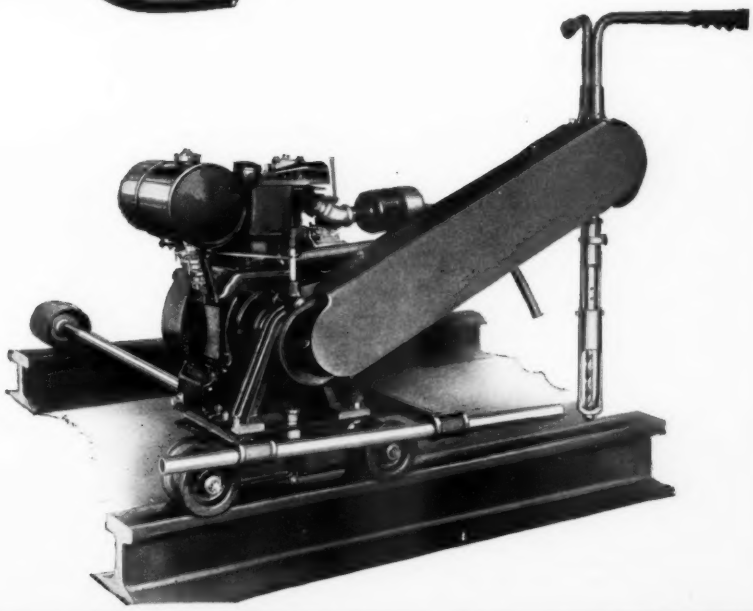
Fast, Efficient.
A great money saver.

Track Wrench Chuck Unit
for vertical driving
of rail clips and screw spikes

When you
use the
RACO
TIE
BORER . . .
Rail holds its
line better.

Another
Money
Saver!



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RAILWAY MOTOR CARS
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. . . designed for today

and built for the years

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Constant improvement, constant redesigning to meet the maintenance needs of today—and tomorrow—is part of the 40-year tradition of Fairmont. A good example is the new Fairmont Quick-Clear Oil Sprayer (W72 Series A). This unit sprays heated oil, under pressure, on both sides of angle bars and switches. This new unit is much lighter in weight than other sprayers and is equipped with pneumatic set-off wheels for easy, fast removal from tracks. This adds greatly to operating efficiency especially in sections where railroad traffic is rather heavy. Into this specialized unit have been built all the best ideas of sound design, as well as the finest functioning parts—and something more—the reputation of Fairmont for building with an *eye to the job* and to the necessity of dependable operation at the lowest possible cost always.

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Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

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Racor Security RAIL BRACES

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Note the tight fit between under side of rail head and base of rail — large cover plate and specially designed cap nuts that protect bolt threads from corrosion due to brine drippings. Simple time saving design reduces labor cost in installation and subsequent adjustment. No special tools necessary.

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Freedom —

A Constant Fight Is Necessary to Protect It

The people of the United States—leaders of industry, small businessmen, farmers, and workers in all lines of endeavor—are beginning to awaken to the threat of national socialism in our country. It is high time they were doing so; there is no time to waste.

Freedom of enterprise, under sound economic control and regulation, has been the foundation of our national greatness and of a standard of living unequaled anywhere else in the world. For more than 150 years it has demonstrated its superiority over all of the isms that have been concocted by man. But this superior way of life is being challenged, even jeopardized, by the growth of cleverly disguised socialistic movements propounded and nurtured by many both within and outside of government, largely for political purposes, which are too often condoned and abetted, largely in ignorance of the ultimate consequences, by industries, businesses and workers seeking temporary advantages. There must be an awakening—a rude awakening—especially of those engaged in transportation.

But that a heartening awakening to the dangers of a socialistic state is taking place is seen in the Freedom Committees, representing all business and industry, that are being formed throughout the country to consolidate all forces in the fight to preserve freedom and free enterprise. Touching off this new counterattack against government encroachment upon business and industry—and all those engaged in it—through the growth of regulation, favoritism, restrictive laws, and the assumption of power by administrative bureaus, was a huge Freedom Dinner held in Chicago recently under the rallying cry, "Let Freedom Ring Forever." Speakers at the dinner, which was attended by approximately 1400 business leaders representing 23 major organizations, included Ray B. Wiser, president of the California Farm Bureau Federation, Henry S. Sturgis, vice-president of the First National Bank of New York, Dr. Robert E. Wilson, chairman of the Board of the Standard Oil Company (Ind.), and Donald Conn, executive vice-president, Transportation Association of America—all of whom, of one accord, warned of the sinister forces that are undermining the economic structure of the country and urged united, aggressive action against them. Speaking for agriculture, Mr. Wiser said that we have been asleep for 30 years, oblivious to what has been taking place at home and abroad, and have awakened suddenly to find that our democracy has become a government of high-pressure groups; that bureaucracy has expanded, with regimentation the order of the day; that class has been arrayed against class; and that free enterprise is being taxed out of existence. "Farm people," he said, "do not want to become the economic slaves of other groups, nor the economic and political slaves of government. We want all individuals and all groups to be free. We do not want a government which controls us, but one which serves us."

Mr. Sturgis asserted that labor is the silent partner of capital, and said that if the advantages of the capitalistic system are to be preserved, the worker will have to be satisfied with his 85 per cent share of production. He estimated that federal, state and municipal governments are taking about 30 per cent of our national income, and said—"that is not taxation, that is confiscation, discouraging the incentive of individuals so much needed in our dynamic economy." "Do we want liberty or

security?" he asked. The history of the world, he said, has shown that those who choose security loose both.

Dr. Wilson warned that "our real danger is revolution by nibbling, and that the "nibbling process" is far advanced. Under this process, he said, "the tax burden is crushing, incentives have been weakened, the shortage of equity capital is serious, more and more industries are hampered by unnecessary regulation, and there is more and more government competition." "We must realize," he continued, "that an attack on the freedom of one is an attack on the freedom of all."

Representing transportation, Donald Conn declared that bureaucracy is pushing industry down the path to nationalization and seeks to destroy the confidence of private investors in this field. "The managers of power-politics at Washington," he said, "are using transportation as the spearhead to impose the 'planned economy' of socialism upon the people of America."

Is all this the exaggerated scare talk of capitalists, disgruntled people out of power, and those antagonistic to the present administration? Anyone who thinks so should read the book "The Road Ahead," by John T. Flynn, or at least the condensation of it which appears in the current issue of Readers Digest. Of this book, which unmasks the grave threat of national socialism, the New York Daily News has said editorially, "This book names names, rips off disguises, exposes many a fake lover of the people, and cites chapter and verse."

Indeed, there must be an awakening to this grave situation, an awakening by all thinking people. And the railroads, and all those industries that supply the needs of the railroads, should be in the vanguard of the counterattack, because, even as this is written, the greatest and most imminent danger to the free enterprise system of our country lies in the attempt of many, both in and out of power, to strangle the railroads.

AN INVITATION TO YOU —

Readers are invited by President Schwinn to attend the annual meeting of the American Railway Engineering Association in Chicago, March 14-16, and are promised a highly interesting and profitable time

F. S. Schwinn

February 1, 1950

To the Readers of
Railway Engineering and Maintenance:

Those of you who are members of the American Railway Engineering Association have been fully informed regarding the next annual meeting of the Association, to be held in the Palmer House, Chicago, March 14, 15 and 16. Therefore, these words are directed particularly to all others interested in railway construction and maintenance work.

The problems of railway construction and maintenance are gradually but surely becoming more complex. Therefore, only through close contact with these problems and their recommended solution may the interested be sure of keeping abreast with the ever-changing picture. Attendance at our annual meeting in March will provide you with a new approach to your problems, and will afford you an opportunity of contacting members of the Association and of hearing the many highly interesting committee reports to be presented.

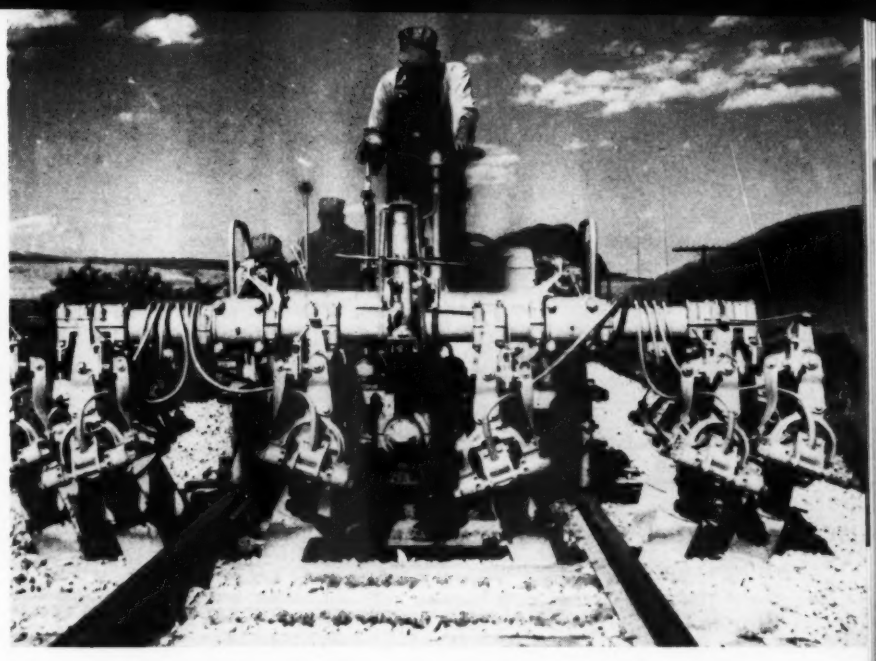
A year ago the A.R.E.A. closed its first half century of service to the American railway industry. Attendance at this year's meeting will give you the opportunity of seeing and knowing how the association has started its second half century. Reports covering the year's work will be presented by 21 standing committees. These will include important conclusions and recommendations, as well as revisions of Manual material. In addition to the reports required by the assigned subjects, a number of committees will present short discussions of special topics falling within the scope of their work, which are expected to be of general interest to all railway engineering and maintenance men.

Although there will be no exhibition of railway appliances this year coincident with the A.R.E.A. meeting, a very worth-while added attraction will be afforded in an opportunity to inspect the new $600,000 research laboratory constructed by the A.A.R. on the campus of the Illinois Institute of Technology. This 50-ft. by 218-ft. two-story structure will house highly specialized electrical, mechanical and container testing laboratories, and the offices of the engineering research staff. The fact that the A.A.R. has provided these modern facilities indicates the recognition that is being given to scientific research. The A.R.E.A. also functions as the Construction and Maintenance Section of the Engineering Division, A.A.R., and, through its several committees, works closely with the A.A.R. research staff in the analysis, interpretation and application of the extensive and extremely important research results.

I can assure you of a very profitable March visit to Chicago and the A.R.E.A. annual meeting. I sincerely hope you will accept this invitation to attend.

F. S. Schwinn,
President,
American Railway Engineering Association

During the last three years the Chicago, Burlington & Quincy has placed in service 29 Jackson Mulitple Tampers to mechanize the tamping work of its ballasting gangs, with the result that the production rates of these gangs have been doubled. Details concerning the operation of these machines and the benefits being realized are presented in this article.



Two views of the Jackson Multiple Tamper in operation on the Burlington. Operated by one man, each machine performs the tamping work of 24 men, and produces savings in a single season more than sufficient to cover the initial cost of the unit. Use of these machines for tamping work on the Burlington has doubled production rates of ballasting gangs

Multiple Tampers Offset High Labor Costs

On the Burlington

• The Chicago, Burlington & Quincy has tackled in earnest the problem of holding down costs of resurfacing in the face of rising wages for track labor. In the last three years it has placed in service 29 Jackson Multiple Tampers —enough such machines to mechanize the tamping work of all ballasting gangs on the system. As a result such gangs on this road, using about the same number of men as before, now move along twice as fast as they did when the ties were hand tamped. The savings produced by each machine in a single season are more than sufficient to cover the initial cost of the unit.

The road reports that the Jackson Multiple Tamper performs the work of 24 men, who are now used for other work in the gang. Records of operating results in 1948 revealed that, compared with previous methods of tamping, 11 machines saved $221,809 in tamping 363 mi. of track. Another benefit that the road reports through the use of these machines is that they produce finished work far superior in quality and durability to that attained in hand tamping. This is due to the more uniform compaction of ballast that is achieved in the machine tamping.

As the result of its experience with a single machine of this type acquired the year before, the Burlington purchased 18 of the Jackson Multiple Tampers in 1948. The other 10 machines were placed in service in 1949 as a result of the impressive savings realized in the 1948 operations.

The Jackson Multiple Tamper is an on-track self-propelled machine equipped with 12 individual, electric vibratory tampers. The tamping units are attached by cradle mountings to a transverse crosshead in an arrangement that permits eight-point tamping of each tie, with 4 tampers outside each rail and 2 inside. The crosshead is mounted on the front end of a four-wheel carriage by means of a cantilever arm arranged to move in a vertical plane. In operation the crosshead and attached tampers, controlled by a single valve, are raised hydraulically and lowered by gravity. The machine is moved from tie to tie by the operator with the aid of a hand-wheel drive.

The electric tampers are mounted in such a way that the blades of each pair of opposed tampers incline toward one another under

This Multiple Tamper is tamping, with old ballast, a 3½-in. track raise made, primarily, to facilitate tie renewals

the tie. The mounting is also such that the tamping blades automatically seek out and consolidate the areas of least resistance. Since the tamping unit is suspended in advance of the carriage, the weight of the machine is always supported on tamped track.

The Multiple Tamper is powered by a 20-hp. gasoline engine which drives the generator for the electric tampers, operates the hydraulic pumps for raising and lowering the crosshead, and propels the machine along the track when running to and from the point of work. The generator supplies 3-phase, 110-volt, 60-cycle current for operating the tampers, and is equipped with a single-phase outlet for the operation of lights and electric tools. The machine can travel to and from the job site at speeds up to 20 m.p.h., and may be removed from the track, when necessary, at a prepared set-off by three men in about two minutes.

Ballasting Operations

During the off season the tamping machines are sent to the Burlington's shop at Havelock, Neb., where they are given necessary repairs in preparation for the next season's work. Distribution of the machines over the system during the working season is governed by the ballast program, and is carried out under the direction of the road's engineer of track. When available the machines are also used effectively in spot-tamping work.

Ballasting operations on the Burlington include tie renewals as well as resurfacing. Therefore, the work is usually accomplished in two distinct track raises. The primary purpose of the first raise, tamped with the old ballast, is to facilitate tie renewals. Resurfacing on new ballast is accomplished in the second raise. Both raises are accomplished with the aid of a power jack.

Making the First Raise

In making the first raise, which averages 3½ in., the power jack works far enough in advance of the tamping machine to keep the latter from crowding the tie-renewal gang working between. The power jack raises the track at each joint, while any sags between are raised by small track jacks. The joint ties are then hand tamped to hold the raise until the machine has passed them. With the machine the actual tamping work requires an operator, and one man on each side hand feeding ballast to the tampers.

In the second raise fouled ballast is removed from the cribs and enough new ballast is unloaded to provide, on the average, a 6-in. lift. Usually, both raises are made with the same gang. Occasionally, however, two gangs, each with a Multiple Tamper, are used. In double-track territory train delays are eliminated by using the detour system, in which the trains are routed over the other track in the vicinity of the work.

The number of men used in the ballasting gangs varies, depending on their availability, the number of ties to be removed, and the amount of the track raise. Three different types of ballast are used on the road—crushed stone (1½ in. maximum size), crushed slag, and gravel — and the Multiple Tampers are used for tamping ties in all three types.

Production Rates

During 1948 and 1949 the Burlington used the Multiple Tampers in reballasting a total of 1193 mi. of track. In the straight resurfacing part of this work, i.e., in the second raise, production rates of the machines hit an average of nearly 3,000 ft. of track per day. For the complete job, including both the first and second raise, the average production, of course, was lower than this, amounting to 1720 ft. of track per day. The difference is attributable primarily to delays to the machines occasioned in making the first raise due to the fact that the ties could not be renewed fast enough to keep the following machine tamping continuously. However, to eliminate the machine delays due to this cause, it would be necessary to renew the ties in advance by digging them in, a procedure that is considered far more expensive than renewing the ties while raising track.

This problem is now under study on the Burlington. A possible solution, now under consideration, is to revamp the gang organization in such a manner as to retain the economic advantages of renewing ties when raising track while at the same time permitting the full potential productivity of the machines to be realized.

FIRE PROTECTION — Automatic System Lays Foam Blanket

Above—Within 20 sec. after operation of the valve AER-O-FOAM is being discharged from all nozzles. Left—In 3.3 min. the depth of foam amounted to 7 in.

• The "Automatic" Sprinkler Corporation of America, Youngstown, Ohio, has recently designed a complete fire-protection system for industrial applications, which employs AER-O-FOAM liquid, consisting of hydrolyzed protein manufactured from a soya bean base, as the extinguishing agent. Applications for this equipment include a number of uses in the railway field, particularly at Diesel locomotive fueling stations, tank-car unloading points, oil storage tanks, waste - cleaning plants and similar locations.

Briefly, the new system involves a foam storage and injection system, and piping system to convey the AER-O-FOAM liquid and water to one or more distribution systems, each including a number of overhead foam aerating and discharge devices. Portable hose stations may also be included in the system. Control of the system is by means of pneumatic heat detectors, known as Heat Actuated Devices (HAD's), which are strategically located throughout the protected area. A sudden increase in temperature near one of the HAD's causes expansion of the air within it, driving air through a system of small copper tubing to a mercury check valve and causing it to function. placing in operation a system of levers.

The action of the lever system, in turn, causes the main control valve — a special valve known as a Rate-of-Rise Suprotex-Deluge sprinkler system valve — to open and release water into the system, and also starts a foam injection pump which releases the AER-O-FOAM liquid to the fire-protection system.

The foam storage and injection system includes a double compartmented foam-liquid storage tank and a small foam injection pump, drawing from the tank. One side of the foam-liquid storage tank is always open to the pump, while the other side is kept closed so that the system may be immediately returned to service following a fire. When mixed with water and aerated, the foam liquid in one compartment of an 800-gal. storage tank will form 58,000 gal. of mechanical foam.

The design of the system is such that the volume of foam discharged will cover the protected area at a rate of about two inches of depth per minute, causing, it is said, the extinguishment of a fire in less than three minutes from the time of origin.

The first installation of the "Automatic" AER-O-FOAM system was made at the plant of the Schenectady Varnish Company, Schenectady, N. Y., where such inflammable liquids as naptha and benzol are stored and handled in large quantities. Tank cars are unloaded along a single spur track, flanked on one side by a building and on the other by a number of storage tanks.

The protected area varies in width between 25 ft. and 40 ft. and is about 450 ft. long. It is divided into three areas, each protected by a separate AER-O-FOAM system, complete with a six-inch Suprotex-Deluge control valve. Each system is provided with 16 or 17 of the foam aerating and discharge nozzles. The foam-liquid storage tank has a capacity of 800 gal.

Service Tests

Service tests conducted in this installation included the standard acceptance tests and also a full-scale test of one of the systems. This test was started by applying a heat-testing pan to one of the HAD's. Within 18 sec. the HAD had functioned and caused the proper Suprotex-Deluge valve to operate. Within 20 sec. after the operation of the control valve—38 sec. after the test was started—the discharge nozzles of this system were releasing AER-O-FOAM at full efficiency. The system was allowed to operate for approximately 3.3 min. and used about 190 gal. of foam liquid during this period.

The foam coverage of the area protected by this system was excellent—a blanket of approximately seven inches of foam having been laid over the unloading track. Removal of the foam blanket proved to be simple, since the foam dehydrated within a few hours and actually dissipated itself.

A unique method was employed for dismantling the Monon's Wabash River bridge when it replaced the old truss spans with new deck plate-girder spans. Considerable savings were effected in the cost of the bridge rehabilitation through a procedure in which, using launching beams, the old spans were dropped into the river, and then cut up and dragged out as scrap. New spans of shorter length were installed by a crane without use of falsework.

Truss span No. 5 (foreground) on the morning of its launching day. It is resting on roller nests which are supported on launching beams blocked up on the old piers

Old Bridge Spans Launched

• Realization of the maintenance engineer's dream of being able quickly to brush aside an obsolete structure and replace it with a new one was largely accomplished when the Monon recently renewed its Wabash River bridge near Delphi, Ind. The old structure, located on the Chicago-Indianapolis main line, could not carry present-day traffic loads at the desired speeds. Consideration was given to making a line change, including the construction of a bridge on a new and better alignment, but because it would cost approximately $3 million this idea was abandoned, and a new plan was adopted which called for dropping the old truss spans into the river one by one by means of launching beams, and replacing them with deck plate-girder spans about half as long as the original spans.

The old structure was a single-track bridge 1,212 ft. long, and consisted of seven pin-connected through truss spans flanked on the north by a 33-ft. I-beam approach span over a public road, and on the south by two 75-ft. deck plate-girder spans. Four of the truss spans were 148 ft. long, two were 147 ft. long, and the other was 123 ft. long.

A history of this bridge shows that the I-beams of span No. 1 (see drawing) were placed in 1909 and were designed for Cooper's E-50 loading. Spans No. 2 to No. 6 were through truss spans constructed in 1905 for E-40 loading. Spans No. 7 and No. 8, also through truss spans, were constructed in 1892 for E-37 loading, while spans No. 9 and No. 10 were deck plate-girder spans, also constructed in 1892 for E-37 loading. Base of rail ranged from 25 ft. to 46 ft. above the ground line. The structure was supported on nine piers and two U-type abutments, all founded on rock lying from 41 ft. to 45 ft. below base of rail, which were constructed of coursed ashlar limestone.

Unique Dismantling Suggested

The age of the structure, its light design and the rather steep grades across it were all against perpetuating this bridge. Although repairs had been previously made from time to time, there was severe wear of the steel at the pin connections of the trusses, and two of the spans were in such a weakened condition that they were each assisted in support by eight wood helper bents. Little more could be done to strengthen the bridge in an economical manner. Moreover, there was no value in the steel except as scrap—a situation which gave birth to the idea of getting the old steel out of the way regardless of what damage might occur to it, that is, by dropping the spans to one side, and replacing the structure without the need of falsework, thus effecting a substantial saving in the new construction.

Part of the plan was to replace the truss spans with deck girder spans of half the lengths of the old spans, thus permitting the quick installation of the new spans by means of one erecting crane. Also, it was decided to establish a uniform grade of 0.53 per cent across the bridge and the approaches, as compared with the previous maximum of 1.68 per cent. The whole project was estimated to cost only $300,000, or only 10 per cent of that required for the line change.

Prepakt Concrete Used

The procedure adopted called for the construction of new intermediate piers between the old truss-supporting piers. Work was begun on the construction of the new intermediate piers on September 15, 1948, and the last one was completed on August 18, 1949. These are of reinforced concrete, 34 ft. to 39 ft. in height, and were constructed in three pourings using the Prepakt method in which the coarse aggregates are placed and tamped in the forms and are then solidified by injecting cement grout under pressure. Anchor bolts were set in the new piers at the time of construction.

While the new piers were being constructed, the old structure was raised on blocking and wedges to the new established grade, and the bridge seats of the old piers were altered to adapt

Span No. 5 has now been rolled out to end of the near launching beam and almost so at the far beam

The welder having severed the tie-down cable with his cutting torch, span No. 5 is shown on its way to the river and eventually to the scrap heap

ed Into River

them to receive the new deck girders. After completing the bridge-seat alterations, the old piers were strengthened by pressure grouting.

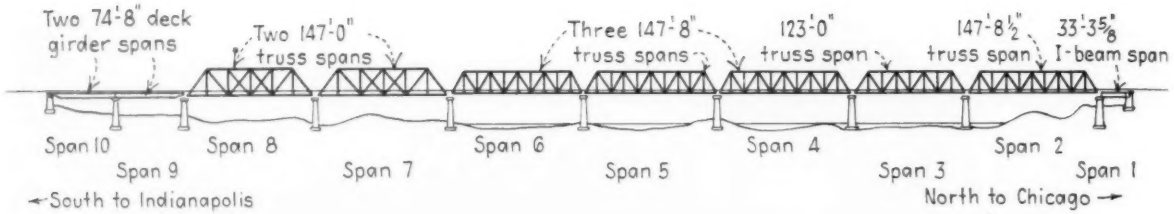
The renewal of the superstructure was carried out in eight major operations; one for each of the seven truss spans and another for replacing the two southerly girder spans. The work commenced at the south end and progressed northerly, except that the replacement of spans No. 3 and No. 4 was made the last two operations. These spans were made 98 ft. 3 in. long to comply with a stipulation of the Indiana Flood Control Commission. This necessitated the abandonment of old pier No. 3 as a support for the new girder spans and the construction of a new pier (No. 2A) 25 ft. to the north.

Work carried out in advance of the launching of each truss span required an average of about seven working days. This work included the jacking up of the truss span ends, the insertion of a launching beam and two roller nests under each end, and the lashing of these beams to the piers; the setting up of hoists and launching rigging; the setting of new anchor bolts and shoes; burning away any steel connections between contiguous spans, such as between spans No. 7 and No. 8 where a common end floorbeam had been used; the strengthening of burned-away end stringers with temporary wood blocking and welded steel angles; and the removal of alternate bridge ties—all of which was done under traffic. Also, out-rigger grillages were placed in position for the crane at the end of the adjacent span.

All of the new girder spans, with exception of the two 98-ft. 3-in. spans, were shipped to Delphi as complete units. Four of the spans weighed 42 tons each, and nine weighed 43 tons each. For installing these spans only one erecting crane was used, which necessitated that the crane pick up its load, swing it through an angle of 180 deg., and then reach out to place it in final position. The crane used was a 150-ton steam locomotive crane with a 65-ft. boom and a counterweight. Because of their greater weight and length the 98-ft. spans were assembled and riveted in the field.

As part of the preliminary work, the crane test-lifted the assembled spans from the flat cars on which they were shipped so that the slings could be properly located for picking up the spans and holding them in a horizontal position. All the bridge ties of each assembled span, weighing a total of about 8 tons, were stored on the crane-end of the span, where they changed the point of balance and served to shorten the reach necessary for the crane.

The launching beams were of prime importance as they not only had to support the truss spans until L-Day, but also had to function as cantilever beams when a span was moved laterally to the downstream side before being launched. Each launching beam was 40 ft. long and was fabricated from two 21-in. CB sections placed on 12-in. centers and tied together laterally. The top of each of the beams served as a track for two roller nests, 10 ft. long, which were inserted, along with truss-roller plates, on the day of launching by jacking up the truss ends. A steel angle was bolted crosswise at each end of the launching beam to serve as a stop for the rollers and prevent the span from rolling off prematurely. The stop on the



Above—Elevation of the Monon's Wabash river bridge before replacement of its truss spans. Left—Close-up view of one of the 40-ft. launching beams in place

launching end permitted the rollers to carry the span 14 ft. laterally, or until the longitudinal centerline of the span was 11 in. beyond the fulcrum point, this point being approximately the downstream edge of the pier top.

One Cut of Cable Drops Span

The upstream ends of the two launching beams under each span were lashed together by means of shackles, turnbuckles and a single ⅞-in. wire cable. The cable passed through blocks securely fastened to each pier about 3 ft. above the ground or water level. In other words, this one tie-down cable prevented both launching beams from tipping while they were in cantilever service.

The moving of each truss span laterally on the launching beams was accomplished by means of two gasoline engine hoists, each pulling on a ⅜-in. tugging line running through double-sheave blocks anchored to a shoe of the adjacent span. Initial impetus was given by a 25-ton hydraulic jack at each end of the span, which was bolted to the top of the launching beam so as to bear against the roller nest on the upstream side. Chalk marks were made at one-foot intervals on one side of the launching beams to serve as a guide for obtaining equal lateral movement at each end of the truss span. Large steel baffle plates were inserted between the span to be moved and adjacent ones to prevent any fouling.

When the truss span had been rolled out to and stopped at the overturning position with its center of gravity 11 in. beyond the fulcrum, a workman at each end of the span unbolted the hydraulic jacks from the launching beams as well as the stop angles on the downstream end. When these had been removed and all workmen were in the clear, a welder severed the tie-down cable by burning it near the center of the span with a cutting torch, thus permitting the truss to drop into the river on its side. The welder, sometimes with the help of the crane, later cut the old span into pieces which could be dragged to shore, by a line fastened to a crawler tractor working on dry ground, where they were cut up at leisure into smaller sizes for loading as scrap. At the times that the old spans were being cut up, the water in the river was not over four feet deep, and no great difficulty was experienced by the welder in this work.

The plan developed for changing out the bridge superstructure required the use of the track for approximately 6 hr. 45 min. for each span. The work started in the morning shortly after the passage of the road's northbound Tippecanoe and a way freight. This schedule made it necessary to detour the southbound Tippecanoe, which normally passed over the bridge at 11:25 a. m., but it did not conflict with the schedules of the northbound and southbound Hoosiers, which are evening trains.

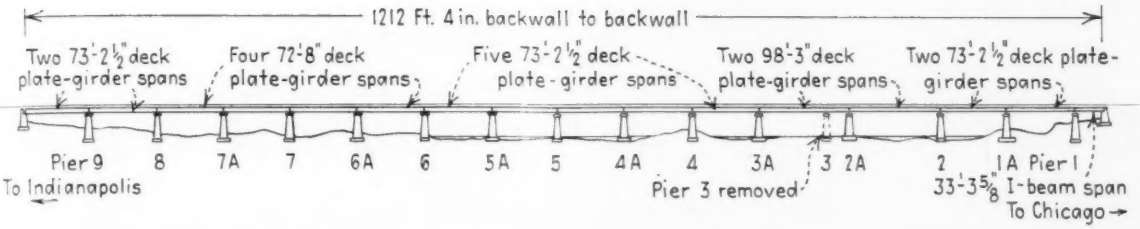
Typical Launching Day

On a typical launching day, the track was taken out of service at 9:45 a.m., at which time the spikes were removed from the bridge ties on the half of the truss span nearest to the crane position, and a string of three rails from each running rail was dragged back off the span. The crane, towing two flat cars on which the first of the two girders spans was loaded, moved up to a position at the end of the contiguous span, where it was blocked and its outriggers jacked solidly on previously placed grillages. This work was completed at about 10:35 a. m.

While the outriggers were being jacked into place, the ties under the rails that had been removed were loaded on push cars and taken to the end of the bridge where they were unloaded. This was followed by the uncoupling and removal of the rails from the remaining half of the truss span, which work was completed about 10:20 a. m. and the removal of remaining bridge ties, which was completed at about 10:47 a.m.

The old truss span was now ready to be moved laterally and a last-minute inspection was made to see that no tools, rope, cable line, and loose blocking were in the way, that the hoist engineers were ready to make their pull on the tugger lines, and, most important, that there were no boats or workmen below the span.

The span was rolled quickly and easily to the ends of the launching beams at 10:52 a.m.—too fast for a photographer to get more than



Above—Elevation of structure after replacing truss spans with deck plate-girder spans. Right—Installing first of two girder spans to replace truss span

one shot—after which the hydraulic jacks and angle stops were removed. At about 11:14 a.m., the welder cut the tie-down line, and the span toppled over.

The crane then lifted the first girder span a few feet above its cars, where the load was inspected for its horizontal position and security, after which the boom was raised to an almost vertical position, and the crane turned 180 deg. to deposit the span on the shoes at about 11:33 a.m. While the steel workers were completing the tightening of shoe-connected rings and pins, other bridgemen broke the moorings from the bridge ties stored at the end of the new span, and distributed the ties.

At this point it might be well to point out that the new girder spans were ordered without top cover plates. The necessary metal required for the bending moment was obtained by riveting plates and angles to the webs of the girders under two upper 8-in. flange angles. The web of each girder was allowed to project about ½-in. above the top angles and served as a key to fit in preframed slots in the bridge ties. With this design, all of the bridge ties could be framed to the same dimensions, and treated. Also, it lightened the work of the bridgemen in distributing the ties as they merely had to slide the ties on their sides along the top edges of the projecting webs to their places, after which they were turned with the dapped side down and dropped securely into place. Distribution of the ties on the new span was completed by 12:07 p.m., and the strings of rails were in place about 15 min. later.

Installation of Second Span

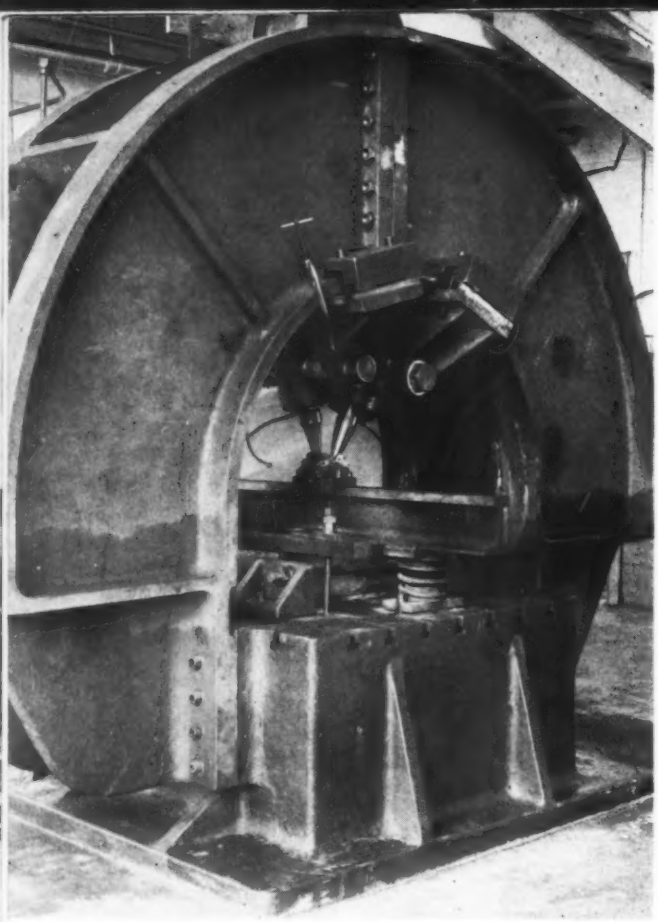
Immediately after lunch, work commenced on the installation of the second girder span. This operation took considerably more of the time that the track was out of service than did the installation of the first span for the reason that very little of the preliminary work incidental to setting and blocking up the outrigger grillages could be done in advance for the second span. It was not until 2:45 p.m. that the crane, with its second girder span on cars behind it, had been blocked up and jacked on its outriggers, ready to swing the second span into place.

The procedure for setting the second span paralleled that for setting the first. The new span was on its shoes at 3:07 p.m., the ties were distributed by 3:40 p.m., and the rails were in place and the track ready for traffic at 4:30 p. m. or exactly 6 hr. 45 min. from the time that the track was first taken out of service.

Replacing Spans 3 and 4

This same procedure was carried out in erecting each of the new spans with the exception of those replacing spans No. 3 and No. 4, where, because of the construction of new pier No. 2A (see drawing), only one of the 98-ft. girder spans and a short 25-ft. temporary girder span were placed when truss No. 3 was launched; and the temporary span was removed and the other 98-ft. girder span and one 73-ft. girder span were placed when truss span No. 4 was launched. This latter truss span was launched and the girder spans were placed on November 8, 1949. These long spans were field assembled with fitting bolts and pins, and the erection of each one required the uninterrupted use of the track for about the same length of time as for the replacement of the other truss spans. This was followed by the field riveting of the spans, and the painting of the entire structure.

Work was completed on this project in December, 1949. The method used for disposing of the old spans and erecting the new girder spans was worked out jointly by the engineering departments of the Monon and the American Bridge Company. All field engineering was handled by the railroad under the general direction of L. F. Racine, chief engineer, and under the direct supervision of A. B. Wang, resident engineer. R. F. Hill, bridge and building supervisor, was also actively engaged in the work. The design and erection of the new structure were handled by the American Bridge Company under the general direction of A. P. Boysen, division engineer, A. A. Porter, manager of erection, and G. W. Faulkner, erecting engineer, while the erection work was carried out under the direct supervision of J. T. Ellis, field superintendent.



The repeated-load testing machine developed by Ramapo Ajax to determine tie plate wear on an accelerated, or short-time basis

Research and Tests —

Smoking Out

In this article, which presents the highlights of an informal address by the author before the Maintenance of Way Club of Chicago on December 19, 1949, Mr. Magee reports that much progress is being made in determining the causes of mechanical wear of ties, splitting and checking, and the relative value of various types of hold-down fastenings, special tie plates, tie pads, and end and surface coatings.

• With the increased cost of ties since the war, and annual tie renewal costs one of the largest items of railway maintenance expenditures—equal to about 12 per cent of total maintenance-of-way costs—it is apparent that a substantial reduction must be effected in tie renewal costs if the railways are to be able to operate successfully under conditions as they may be anticipated in the future. In fact, it has always been rather interesting to me that we have expended major sums for research on rail, while relatively little has been spent on ties, in spite of the fact that the expense of tie renewals is about twice that for rail renewals. At the present time the number of ties renewed annually is in excess of 40 million, and the average cost per tie in place approximates $4.00. Obviously, therefore, only a small increase in tie life would result in substantial savings.

The major factors determining the usable life of ties are mechanical wear, or abrasion of the tie under the tie plate, due to traffic, and checking and splitting. One would think that the intensity of vertical pressure was probably an important factor in mechanical wear. Dr. Hermann von Schrenk, in his treatise on mechanical wear of ties, published in A.R.E.A. Bulletin No. 306, June 1928, presented the conclusion that tie wear is largely the result of the lateral motion of the tie plate on the tie, rather than of vertical pressure. In undertaking our investigation, we were inclined to agree with Dr. Von Schrenk's conclusion, but nevertheless, felt that we should start from the beginning of the problem.

Accordingly, a dynamometer tie plate was designed which could be placed in track, and from which the actual loads applied to the tie plate from regular trains could be determined. The design of the plate was such that not only could the amount of load be determined, but also the eccentricity of the load with respect to the center of the rail base. Measurements were made with these plates under regular trains on both tangent and curved track, and on several roads.

It was found that the maximum tie plate load occurred under the low rail on sharp curves, under steam locomotives moving at slow speed. At this same location it was found that the vertical loads on the tie plates were accompanied by quite high lateral forces, and that the result of this combination of loading was to produce a high intensity of bearing pressure on the tie at the outer end of the tie plate. This correlates with observations in track, with which all maintenance men are familiar, that excess cutting takes place at the outer toe of the plate and results in a tendency for wide gage and increases in the rail cant. This is undoubtedly the location in track where the greatest intensity of bearing pressure occurs, and from the measurements made at these locations it was determined that pressures as high as 600 to 700 psi. probably represent the maximum values that would ever be developed.

Accelerated Pressure Tests

The Ramapo Ajax Division of the American Brake Shoe Company became interested in the problem of tie wear because of its interest in a new design of tie plate hold-down spike, and undertook to build a repeated-load testing machine, by means of which tie plate loads that normally occur in track could be applied repeatedly to a tie plate seated on a tie, and the resulting wear thus obtained on an accelerated, or short-time, basis. Ramapo engineers conferred with us for recom-

t the True Causes of Tie Failures

By G. M. MAGEE
Research Engineer
Association of American Railroads

mendations as to the tie plate loads that should be applied. We recommended that the loading should be alternated, with one loading having a 20,000-lb. vertical force, with a 10,000-lb. component outward, and the next loading having 20,000-lb. vertical load, with 5,000-lb. inward. This would tend to produce a lateral motion of the tie plate corresponding to that produced in track under regular trains. The loads recommended do not represent the maximum tie plate loads that we had measured, but were considered to be the average maximum loads that would be repeated in track with enough frequency to be a factor in producing tie wear.

Testing Machine

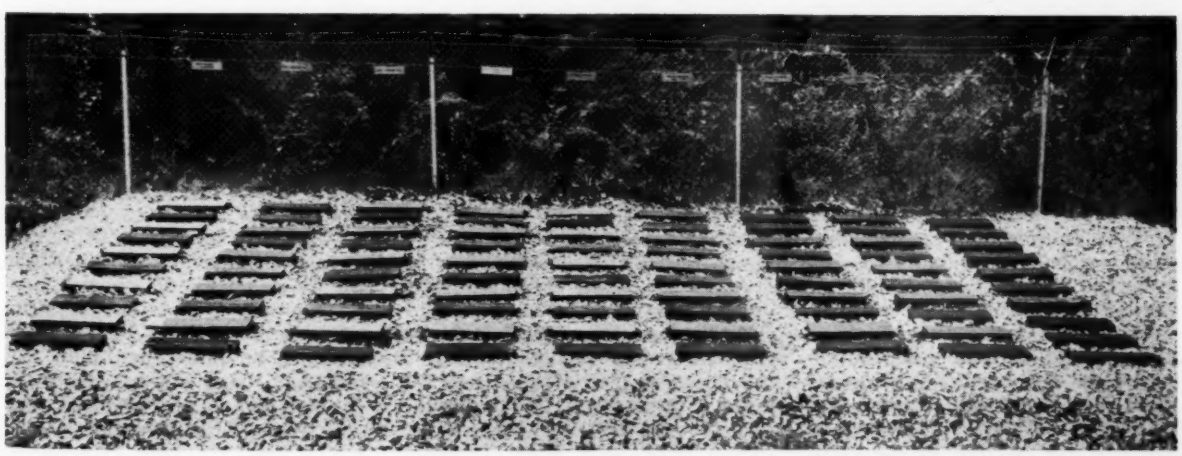
The Ramapo Ajax Division had the testing machine constructed in the American Brake Shoe Company's laboratory at Mahwah, N. J. Its design called for considerable ingenuity, but an excellent job was done in designing and constructing the machine and it performs quite satisfactorily.

The first test made was on an untreated fir tie on which was placed an A.R.E.A. 7¾-in. by 14-in. double-shoulder tie plate, supporting a short length of 132-lb. RE rail. The machine was placed in continuous operation and 40 millon applications of loading were applied to the plate. Upon removal of the tie plate, however, it was found that even this tremendous number of loadings had produced absolutely no discernible wear on the tie surface. During the operation of the machine it was noted that there was no movement of the tie plate on the tie with the alternate reversals of the inward and outward loadings. It appeared, therefore, that the coefficient of friction between the tie plate and tie was more than the angle of the resultant of the vertical and lateral loads applied to the plate. This was found to be true and seemed to explain the lack of lateral movement of the tie plate.

Accordingly, another test was started and water was slowly dripped into the tie plate holes, keeping the surface between the tie plate and tie continually wet. With this arrangement, after only 1,600,000 cycles of loading, the plate had worn into the tie almost ¼-in., and the appearance of the tie corresponded exactly to that of a plate-cut tie in track. It was evident during the test that, with the addition of the water, the lateral motion of the tie plate had been greatly increased. Possibly this was due to the lubricating effect of the water, lowering the coefficient of friction between the tie plate and the wood, and perhaps there may have been some accompanying softening of the wood fibers beneath the plate. In any event, it is quite certain that the presence of water can be a very important factor in the abrasion of ties. This accelerated laboratory test is added positive and concrete proof that the vertical pressure of the tie plate on the tie is not the determining factor in tie wear.

Joint Research Under Way

Two years ago a joint research project was entered into by the National Lumber Manufacturers Association and the Association of American Railroads, having for its



The surface coating test at the Teco laboratory is demonstrating that some coatings are helpful in retarding checking

objective the prolonging of tie life by reducing mechanical wear, and checking and splitting, the work to be carried out in the laboratory of the Timber Engineering Company, which company is a subsidiary of the N.L.M.A. One of the first phases of work undertaken in this investigaton was the laboratory study of representative plate-cut crossties removed from track. The worn sections beneath the plates were carefully prepared and studied under the microscope.

Types of Wood Failure

In these studies it was found that the cellulose structure of the wood showed three types of failure: crushing of the springwood cells, buckling of the rays, and lateral displacement of the cells. Specimens of the same types of wood were subjected to various intensities of bearing pressure in order to determine whether at some pressure the same type of cell distortion could be obtained. It was found that this could be done, but the bearing pressures required were in the order of 2,500 psi. for oak and 1,500 psi. for fir and pine. These values are three to four times the maximum bearing pressures that we have any reason to anticipate are developed in track. This, then, may be considered further evidence that the intensity of bearing pressure is not the important factor in producing tie wear.

Study Plate Movement

Measurements were made in the track under regular trains of the lateral motion of a tie plate on the tie. A special gage arrangement was devised so that the movement of the plate parallel to the tie axis could be measured, as well as its movement parallel with rail axis. Measurements were made on ties under several trains on two different railways, and study of the records indicated that, in general, a slight outward movement of the plate, on the order of 0.002 to 0.004 in., occurred immediately under wheels, and that this was frequently accompanied by an equal amount of movement parallel with the rail. Occasionally a rather large movement of the tie plate was indicated, but examination of the records showed that this occurred between wheels and appeared to be due to the plate sticking to the rail base, and being raised off of the tie by the wave motion of the rail. Inasmuch as this movement occurred when there was no pressure on the plate, it is doubtful that it was important in producing wear.

A section of the A.R.E.A. test track on the Louisville & Nashville, where five different types of tie pads are being observed under quite heavy traffic density

In 1946 a service test was installed on the Louisville & Nashville, near London, Ky., to compare the effects of various types of tie plate fastenings in reducing mechanical wear. The types of fastenings included screw spikes, drive screws, dowel screws, drive cut spikes with spring washers, through bolts, etc. Gages were designed and base points established on the ties from which the rate of penetration of the tie plates into the ties could be carefully determined. Unfortunately, a considerable period of time will be required before this service test develops any very conclusive information. However, it is believed that some very comprehensive data will eventually be obtained.

Tie Pads—Special Plates

Along with this test of plate fastenings were included tests with five different types of tie pads. These tests are on both tangent and curved track under quite heavy traffic density. The two years of service tests to date have not been sufficient to develop any generally conclusive information as to the degree of suitability of the various types of pads. However, one type, of a rather hard material, was found to be abrading the tie surface as rapidly as would a tie plate. In the case of another type there was not sufficient compressive strength in some of the component layers and the material of these layers was forced out by the high pressures. It was also found that some of the very thin pads used were forced out from under the tie plates, tearing through at the spike holes.

Judging from observations to the present time, it seems evident that a suitable tie pad should be able to withstand decay, rot, water, oil, brine, and perhaps some types of insects, and must have sufficient compressive strength to withstand the bearing pressures developed. It would seem desirable further that the pad adhere to the tie surface, and necessary that it effectively prevent moisture from contacting the tie surface under the tie plate.

Another development of considerable interest is the use of a special tie plate on curves. Studies we have made in track have indicated that, especially on the low rail of curves, and sometimes on the high rail, the amount of eccentricity provided ordinarily in tie plates (¼ in. to ⅜ in.) is entirely inadequate to keep the tie plate from cutting excessively at its outer toe, thus permitting the rail to cant outward.

Designs Prepared

Measurements have been made of the amount of tie plate cutting at both the inner and outer toes of tie plates on curves of various degree on several railways. From the data obtained, designs have been prepared for a special 15-in. tie plate for 115-lb. RE rail, and a 16-in. tie plate for 132-lb. RE rail, each having 1¼-in. eccentricity, for use on curves of 3 deg. and over. It does not seem practical from our measurements to state specifically whether the

Taking tie plate penetration readings, with special gage, on L. & N. test track

plates should be used under one or both rails because this will depend upon the relation of the general operating speed on the curve to the speed for which superelevation is provided. Accordingly, it seems that the only practical solution is to place the special plates at locations where needed, as selected by local maintenance men who are familiar with the special conditions on each individual curve.

There will be some objection, no doubt, on the part of the railway engineers to the use of a special tie plate on curves because of the additional stock of plates required and the necessity for special attention in seeing that the plates are distributed and applied where needed. However, when it is considered that this application occurs only once, it seems that this care is well justified by the labor savings in re-adzing the ties, and in the reduction in tie damage resulting from spiking and adzing.

Splitting and Checking

The studies to reduce the splitting and checking of ties have been carried out entirely in the TECO laboratory as part of the cooperative arrangement between the A.A.R. and the N.L.M.A., previously referred to. Of particular interest in this investigation was the determination that most of the checking and splitting of the ties occurs during the seasoning period. This made it evident that if any substantial control of splitting and checking is to be effected, the remedial measures must be instituted immediately after cutting the ties. Accordingly, one of the most important parts of the investigation being carried out is an attempt to develop a method of treating ties while green, which will eliminate the seasoning period with its attendant cost, in addition to bringing about a reduction in checking and splitting.

Process Under Study

The process now being studied intensively has for its objective a means for the seasoning and treating of ties in one operation. It is hoped that this can be effected by adding to the creosote solution a chemical which is miscible with water. The objective of this process is to attract the water from the wood cells into the solution, replacing it with the creosote treatment. Preliminary tests indicate that there is considerable promise of such a method being developed on a practical and otherwise satisfactory basis.

Extensive tests were made at the TECO laboratory with various types of end coating compounds. The ends of ties are especially subject to checking and splitting due to their more rapid drying, and it was thought that application of an end coating might perhaps be of value in retarding or preventing this. It was found that certain of the products used were helpful for a few months, but that after exposure had reached six months or more there appeared to be very little difference between the amount of checking and splitting in the ties treated with any of the end coatings, and in those ties with no end coating. Actually, the effect of an end coating is to slow down the rate at which the moisture leaves the green wood. It was concluded that any end coating which would be sufficiently effective to prevent checking and splitting would so delay the seasoning of the wood that decay would become of concern.

Surface Coatings

Another study at the TECO laboratory which offers promise is the use of a surface coating on ties already in track, or on freshly treated ties to be installed, which contain some checks and splits. It was believed that if checks and splits which had started could be effectively sealed by the coatings, this might be helpful in delaying their further progress.

With this in mind, an exposure test section was established at the laboratory to compare the effectiveness of various types of surface coatings for this purpose. After several months' service, a few of the coatings used show a very favorable appearance and indicate that they may be quite helpful in preventing the progress of checking and splitting.

Chemical Deterioration

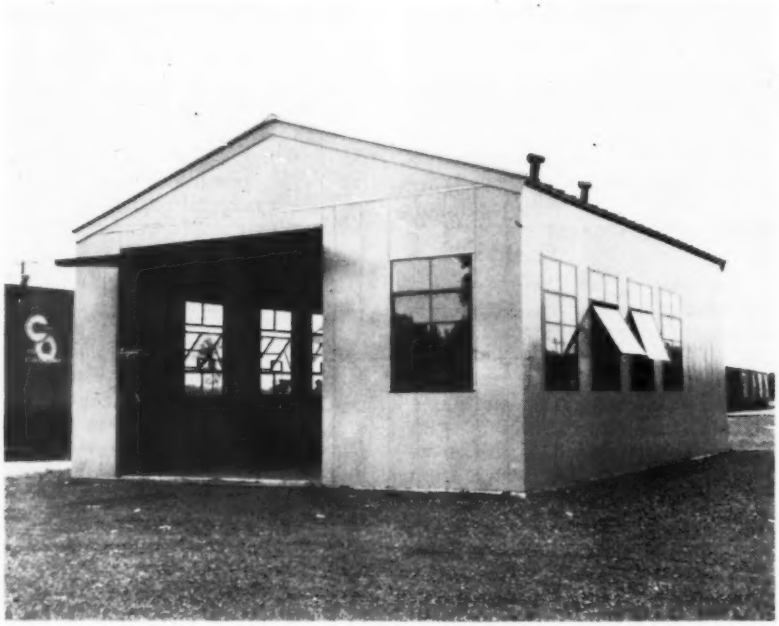
Another development of interest in the laboratory investigation is a study of the chemical deterioration of the tie fibers in the tie plate area. There is some evidence that moisture in combination with the wood acids attacks the steel and carries iron into solution, and that this dissolved iron in turn attacks the cellulose structure of the wood, causing a chemical breakdown.

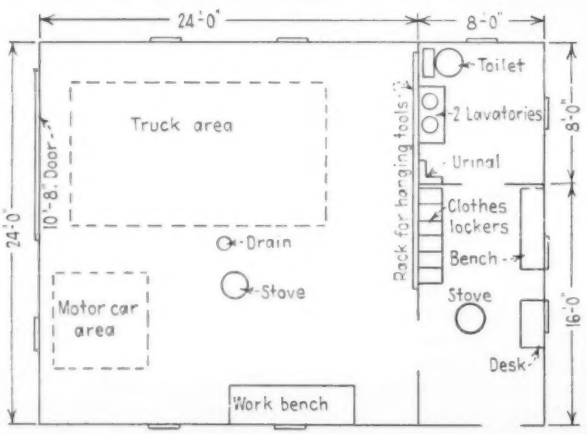
Work is also being carried on in the laboratory investigation on the development of a laminated tie. One of the principal problems to be overcome in the production of a laminated tie is to keep the cost within economical limits. At the present time adhesives are available which are thought to be sufficiently strong and durable for gluing the laminations successfully. The cost of gluing, however, by methods now in use, is prohibitively high for the production of ties.

40 Year Tie Life Possible

If the objectives—(1) to develop a method of treating which will remove water from the wood cells and replace it with a creosote solution without producing stresses in the tie due to moisture change of sufficient intensity to cause the development of checks or splits, and (2) to provide a tie so treated with a special coating of the entire surface which will effectively prevent the addition and depletion of moisture content in the tie with the changing seasons in track—can be accomplished in conjunction with the elimination of mechanical wear, it seems logical to suppose that an average tie life of 35 to 40 years can be obtained in this country. It is interesting to note that in all of the ties sent to the TECO laboratory for examination, practically no evidence of decay has been found so far.

Section Tool





Above—One of the many steel section car houses being provided on the Pere Marquette district of the C.&O.

Left — A typical floor plan of the section car houses

Below—A general view in one of the houses, showing tool racks on wall separating the main area from office

• The Pere Marquette district of the Chesapeake & Ohio is in the process of modernizing its section tool houses—or section car houses, as they are called on this road—under a program which has already seen more than a dozen replaced, including 5 of the 13 on the Detroit division alone. In this program, which is designed both to rid the property of old, inadequate frame structures, some of which were unsightly, and to meet the new requirements for larger quarters to house in each case a highway motor truck, motor car, and certain power tools used by the section forces, the road is using a standard size, shop-fabricated type of steel building, which, in addition to the general work area, provides a foreman's office and a toilet room for the men. In every instance thus far, according to plan, the new section headquarters are provided with heat, electric lights, running water, clothes locker, bench for men to sit on while eating lunch, and a neat arrangement of tool racks and material bins.

Details of Construction

The new standard section car houses, designed to afford a pleasing appearance, increased comfort and conveniences for the men, and space for a highway motor truck, are all Armco Steelox, prefabricated buildings, erected on the site, on a previously poured concrete foundation and floor, by the road's building forces. These buildings come in interlocking steel panels of 20-gage material, 16 in. wide, which fit together to form self-supporting sides, gable roof, and interior partitions, with openings in the walls, as desired, for standard steel doors and window sash. All parts are fastened together with specially hardened galvanized bolts and screws.

The houses on the Detroit division, which are typical of those built elsewhere on the road, are 24 ft. wide, 32 ft. long, and 10 ft. high to the eave line, and are divided by a transverse metal partition, 24 ft. from one end, into a

Houses Go Modern

Prefabricated steel buildings on the Pere Marquette District of the Chesapeake & Ohio provide room for a highway motor truck and all other equipment, and afford special conveniences for foremen and their men

The foreman's office—with toilet room beyond—affords the foreman a place to work, and conveniences for the men. Note the oil-burning heater and the drinking fountain

general equipment and tool area, 24 ft. by 24 ft., and an office and toilet area 8 ft. by 24 ft. By affording room for a truck, the use of separate garages or other buildings, or the necessity for leaving the trucks in the open, have been precluded, with the added advantage of having the truck always with the gang, for convenient loading and unloading of tools, equipment and materials. The office, which has a door opening into the general house area, is 8 ft. by 16 ft., and is separated by a metal partition, with door, from the toilet, which is 8 ft. by 8 ft.

The steel sheets of which the houses are made are galvanized and otherwise specially treated to resist corrosion and to permit immediate painting, if desired. However, since the material used is resistant to corrosion, the road makes no immediate effort to paint the houses as soon as erected, but is letting painting go until it can be done in the orderly painting program of the division painting forces. When painted, the houses are given two coats of lead and oil, light gray, paint.

Doors and Windows

All doors, window frames and sash of the buildings are of steel, the arrangement and number being generally as shown on the accompanying plan. However, some of the houses have been provided with additional windows, as shown in the accompanying photographs, to improve interior daylighting, as seemed desirable, at these points. Most of the sash are of the ventilating type. The truck entrance door is of the up-folding, steel panel type, counterbalanced for easy operation, and provides an opening 10 ft. 8 in. wide and 7 ft. high.

Because of the cold weather that prevails generally on the road in winter, all exterior walls of the houses are lined with wood beaded ceiling material and are insulated with 3-in. rock wool batts. The ceilings provided in the houses, to help reduce heating costs and to afford comfort, are generally of insulating wallboard. The concrete floor throughout the buildings slopes slightly from all directions toward a drain in the center of the general work area. Throughout, the interior is painted—a dark gray on all sidewalls to a height of six feet, with a lighter gray above and across the ceiling.

Designed to house a highway motor truck, with which all main-line sections on the road are being equipped, the new houses are laid out parallel with the adjacent tracks, with the truck door opening on one end, to afford easy entrance and exit, and the truck, when housed, occupies the floor area immediately inside the door. This arrangement, as shown on the plan, still leaves adequate room for housing a track motor car, which most sections retain for emergency or special use, and also for quartering a four-tool pneumatic tie tamper, with which each section is equipped. It also affords room for a centrally located heating plant, for tool racks, and for a work bench.

The tool racks, as shown in one of the accompanying photographs, are located on the partition wall separating the general room from the office and toilet area, and are specially designed to insure the safe and orderly storing of tools. An elevated, steel wall-hung rack is provided for shovels, ballast forks, scuffle hoes, mauls, sledges, and other long-handle tools, as well as for miscellaneous tools and equipment, such as tie tongs, buck saw, track level and scythes. A lower rack, of wood, is designed for holding all bars, wrenches and other small hand tools.

The office area provides ample space for a foreman's desk and chair, a bench for six men, and six individual steel clothes lockers. The toilet has a toilet bowl, a urinal and two wash basins, all with running water from city or community supply.

Lighting and Heating

All areas of the houses are provided with electric lights, and, as already indicated, are heated in winter. Heating is by means of two sparate heating units—pot-belly coal stoves, or oil-burning heaters. Generally, where available, the coal stoves are being used in the general house area, and the oil burners, which are cleaner and more compact, are being used in the office-toilet area. However, some of the houses have oil heaters in both areas. The separate heaters permit maintaining a lower temperature in the general house area, and a higher temperature in the office and toilet area, as may be desirable at times. Carrying out the program of new section car houses on the Pere Marquette district has been under the general dirction of H. J. Bogardus, chief engineer of the district, and R. A. Morrison, engineer maintenance of way.

The test chemical spray car. Multiple-nozzle spray pipes extend across and to each side of front of car, covering a total width of 20 ft., when car is in operation

This article describes the extensive program of research in roadbed weed control for railroads that was carried out last year by the R. H. Bogle Company, Alexandria, Va., in conjunction with the Virginia Polytechnic Institute, with the cooperation of the Southern and the Seaboard Air Line. The program involved a total of 453 track plots, each 20 ft. wide and ¼ mi. long, at six locations scattered throughout the Southeast. Practically every chemical now in use for weed control was tested in the program.

Research—Seeks Key to Chemical Weed Control

• The problem of weed control on railroads began at the start of the railroad era. Hand weeding was superseded by burning and mowing and, more recently, by chemicals, millions of gallons of which, in various combinations, have been used in the hope of providing a complete kill of all track vegetation. Experimentation and research have been engaged in by chemical companies, the railroads, and the federal government. During the war, a hormone, 2,4 dichlorophenoxyacetic acid (2,4-D), a selective killer, designed especially for agricultural use, was developed. This and numerous other chemicals have been used in the railway field, but the varying degrees of success achieved have indicated the need for a long-range program of research.

For many years the R. H. Bogle Company, Alexandria, Va., manufacturers and applicators of chemical weed killers for railroads, had such a research program in mind. In 1948 this company employed a young chemical engineer, Jack P. Taylor, who expressed a desire to return to college to work for a master's degree. He decided on "Weed Killers for Railroad Use" as the subject of his thesis and, with the cooperation of the Bogle Company and Virginia Polytechnic Institute, undertook a research program of considerable magnitude.

This program has involved both laboratory and field tests, the latter being made at six widely scattered locations in the southeastern states. Copies of 43 patents were obtained and every available publication on the subject was investigated in an effort to include every chemical formulation offered as a weed killer. The laboratory research consisted of greenhouse applications of 50 test formulations on Johnson grass. Those chemicals that showed promise in these tests were selected for further study under field conditions.

The six test locations, selected to represent the entire Southeast as regards weather, soil, types of vegetation, stages of growth, etc., were at Palmetto, Fla., on the Seaboard Air Line, and at Valdosta, Ga., Marion Junction, Ala., Chattanooga, Tenn., Rock Hill, S. C., and The Plains, Va., all on the Southern.

Field tests were begun on April 13, 1949, at Palmetto. Track test plots ¼ mi. in length were measured in advance with check plots separating them. Wet and dry-bulb temperatures, humidity and wind velocities were recorded, and samples of soil were taken from each plot for later analysis. Types of vegetation were record-

View as inspection car approaches the marker at the beginning of a test section

ed, even to an actual count of each type of weed and grass in a representative square foot of each plot. Still photographs and motion pictures in color were secured of each plot prior to the chemical application.

The field applications were made by a specially constructed spray outfit mounted on a section push car, which included a pipe spraying arrangement designed to cover a swath 20 ft. wide. When in use this outfit was pulled by an ordinary section motor car at predetermined speeds, for which purpose a speedometer was attached to the hauling unit. Upon completion of applications at Palmetto, the research group repeated the operations at each of the other five locations.

Observations were made at all test plots one week and one month after application. Weather conditions during the interim were checked, records were made of the percentage of kill of each type of growth, and color stills and movies were taken of each plot. This comprised the first series of tests.

Following completion of the first series of tests, the research group returned to Palmetto, early in June. Some formulas used in the first series were deleted because of their ineffectiveness or lack of promise, and were replaced by others. Where chemicals showed promise but not an impressive kill, repeat applications were made. Thus, the second series of applications, again on 20-ft. by ¼-mi. plots, were made at all six locations, with weekly and monthly observations.

The third series of applications was started at Palmetto early in August, and the same procedure was followed. The season's testing was completed at the Virginia location on September 4.

On September 28, the Bogle Company sponsored an inspection of the tests at The Plains, Va., and invited the Committee on Roadway and Ballast of the American Railway Engineering Association, and other maintenance officers, to attend. Following the inspection, color slides and color motion pictures were shown—details of the tests being described by Mr. Taylor.

The Bogle Company has expended more than $25,000 in this research program. Each of the research engineers involved traveled approximately 35,000 mi. in 5 months to apply the chemicals and make observations. Tests were made on 453 one-quarter mile plots, 330 soil samples were analyzed, and 1,359 still photographs and 6,000 ft. of motion pictures—all in color—were taken. Compilation of the data has proved to be time-consuming and costly, and is expected to result in a 600-page report.

The Committee on Roadway and Ballast has invited Mr. Taylor to participate in the A.R.E.A. March convention program, to present the preliminary results of the research. This presentation, it is planned, will include the simultaneous showing, on three screens, of color slides of various test plots taken before, one week after, and one month after the test applications were made, with explanations of the results obtained.

Not expecting complete answers in its one-season tests, the Bogle Company plans to continue the research program through the present year, and beyond, in an effort to help remove guesswork from track weed-control problems. It is expected the report on research conducted in 1949 will be ready for distribution in March.

The Burlington's electric rotary plow, designed for use with Diesel locomotives

Electric Snow Plow Makes Debut

On the Burlington

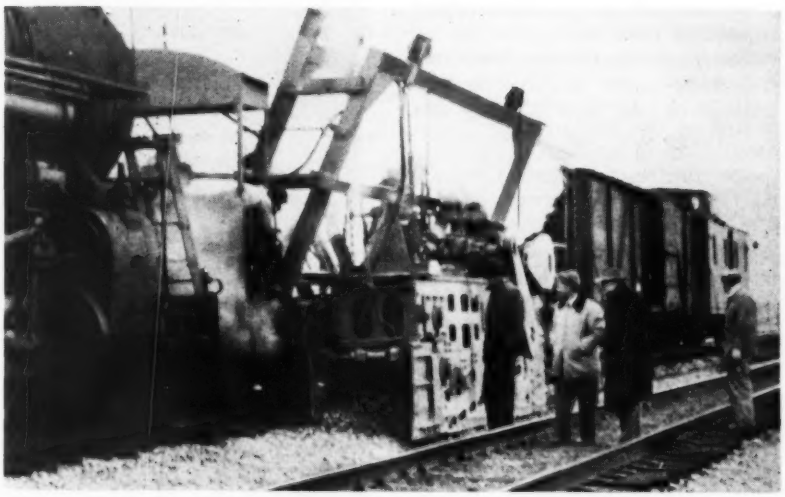
• Heavy snow falls on the Chicago, Burlington & Quincy are now being removed from the tracks by a type of rotary snow plow entirely new in America—an electric unit designed for use with Diesel locomotives. This plow is expected to demonstrate marked advantages. For one thing it delivers a larger amount of power and torque to the rotor shaft and can, therefore, cut and clear snow and ice formations from the track at a relatively rapid rate. For another it can be worked over long distances and periods of time without refueling or rewatering.

The Burlington's new plow is 16 ft. high, 36 ft. long and weighs 91 tons. Constucted in the company's shop at Denver, Colo., it utilizes the frame, trucks, rotor and rotor chute of an old American locomotive steam plow. Its cab, car body, and electrical and mechanical parts, however, are entirely new. The 11½-ft. rotor blades are driven by four traction motors which take power through necessary connections from the generator of the first unit of any readily available four-unit Diesel locomotive.

The cab of the plow, thoroughly insulated and kept comfortably warm by an oil heater, seats two persons in addition to the operator. The latter sits at the right side of the cab. Immediately in front of him is the controller for the rotor, the recording instruments, and an air-brake emergency valve.

In extensive tests recently a new heavy-duty, locomotive-propelled machine, called the Ballastmaster, cleaned ballast on both track shoulders simultaneously to a depth of 8 in. below the ties at a maximum daily rate of six miles in six hours of on-track time. This machine is described herein.

Steam Machine Enters Ballast-Cleaning Field



After being lowered to desired depth of cleaning, the boxes are dragged along, the foul ballast entering their front ends and moving backward over vibratory screens

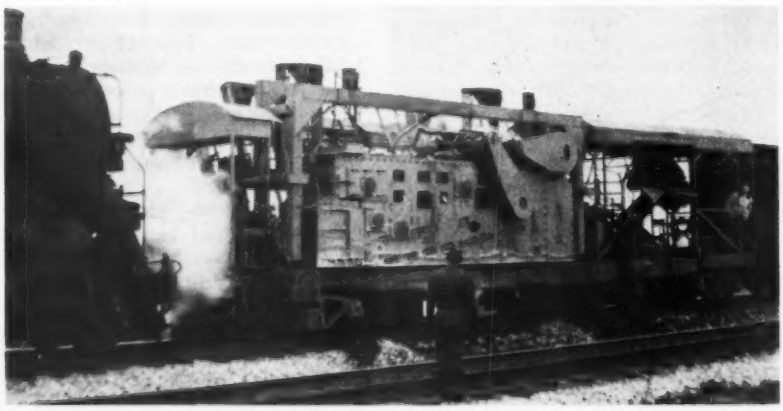
• Railway Ballast Engineers, Inc., Milwaukee, Wis., is introducing the Ballastmaster, a heavy-duty ballast cleaning machine about the size of a large box car, which is said to be capable of cleaning a path of ballast 4 ft. wide on both sides of the track simultaneously, at a speed of a mile an hour. All operations of the machine are powered by steam turbines, using steam furnished by a locomotive which also supplies the propelling power, both when moving to and from the job location and when working.

Cleaning Boxes

The key parts of the Ballastmaster are two cleaning boxes, one on each side. The remainder of the machine is simply a mechanism for supporting and manipulating the boxes. While the machine is being moved to the work site, each box rests on the deck within a boom framework consisting of two inverted U-shaped frames placed parallel to each other and linked together to act as a pantograph. Each box is raised and lowered by the boom by cables, fastened to the four corners of the box, which extend to, and are actuated by, a set of hydraulic cylinders mounted on one of the frames of the boom. The cylinders are actuated by a turbine-driven hydraulic pump.

In preparing the machine for operation the first step is to move the boxes outwardly. This is done by causing the booms to pivot about their bases, which are attached to the deck of the car, until the boxes hang clear of the deck. (The pantograph action of the booms causes the boxes always to hang in a vertical plane). Next, by actuating the boom cylinders, the boxes are lowered to the desired depth of cleaning, at which point they are suspended from the booms by chains which limit the downward travel. When in operation the boxes are hooked to the sides of the car by overload-release devices, permitting automatic disconnection in case of overloading or striking an immovable object.

The front of each box is equipped with in-gathering wings. The tie-side wing can be adjusted by the operator while the machine is in operation to gather all ballast up to the tie ends, regardless of variations in the lengths of the ties. The other wing is set by the operator as desired before the operation starts, and is immovable while the machine is in motion. Fastened to the bottom of the front end of each box is a gouge that digs up the ballast. A flat subgrade surface is formed behind each box on which the clean ballast is redeposited.



While machine is being moved to work site, the boxes rest on the deck, as shown here

How Dirt Is Removed

As each box is dragged along, the foul ballast enters its front end and is propelled backward and upward over a vibratory screen by flights made in the form

of rakes, the flights being fastened to two chains. The teeth on the rakes are spaced alternately on every other flight so that, as the ballast progresses through the cleaning operation, it is thoroughly churned. The screen in each box is 12 ft. 6 in. long by 31 in. wide, and is especially designed to remove the wet, sticky material often found in ballast cleaning.

Dirt and debris passing through each screen is first deposited on the subgrade, is then pushed to one side of the box by plows and, finally, is picked up by a bucket conveyor at the back end of the box. The buckets elevate the dirt to a height of about 8 ft. and discharge it to a chute or a transverse belt conveyor which carries it to the side of the roadbed. The cleaned ballast from each box is first deposited close to the tie ends, and is then shaped and distributed to any desired ballast contour by a special ballast shaper located to the rear of the box.

In double-track territory the intertrack box cleans the ballast in half of the intertrack space. Trains on the adjacent track are able to pass while the machine is working if the track centers are 14 ft. or more. In most cases, however, the intertrack cleaning box is raised and placed on the deck of the machine so that trains can pass at full speed. This takes about 30 sec. To clear trains on the track being worked, it is said that the machine can be made ready for movement to a siding also in only 30 sec.

Operating Results

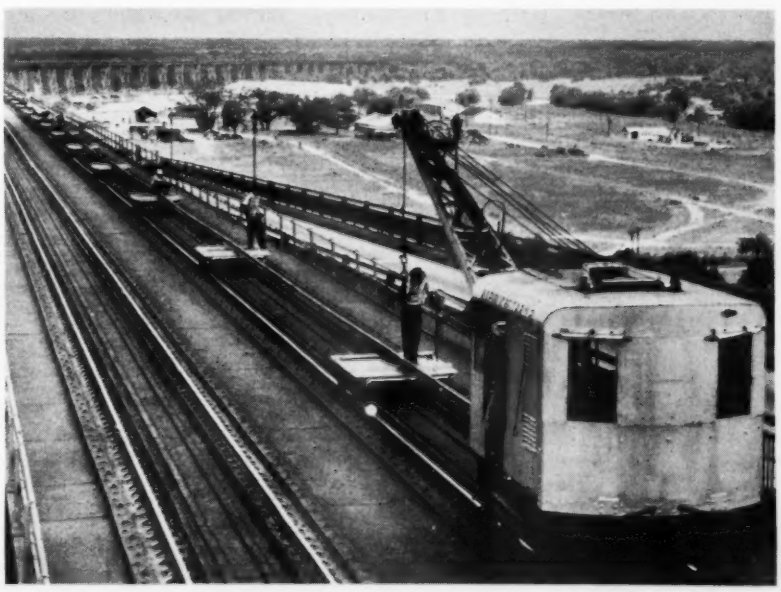
Operation of the unit requires a locomotive and a full train crew. The cleaner itself is manned by a chief operator, assistant chief operator, three operators and two assistant operators. The speed of operation with the machine depends on various factors, including the size of the ballast section and the amount of moisture and dirt in the ballast. It is reported that the machine will remove 90 to 95 per cent of the dirt in the ballast in one pass when the dirt does not exceed 35 per cent by weight of the fouled ballast, and the moisture in the dirt does not exceed 6 per cent. In extensive tests of the machine during the past year, when cleaning both track shoulders simultaneously to a depth of 8 in. below the bottoms of the ties, working speeds under favorable conditions reached as high as 200 ft. per min. The maximum daily rate of cleaning, both sides, in this test was a little over six miles in six hours of on-track time.

Assuming an average of only three miles per day, direct charges, including rental of locomotive, are estimated to amount to about $125 per mile. Although the machine as described in the foregoing is designed for use with steam power, it is reported to be readily adaptable without basic changes in any of its parts, except its steam turbines, for Diesel-electric operation.

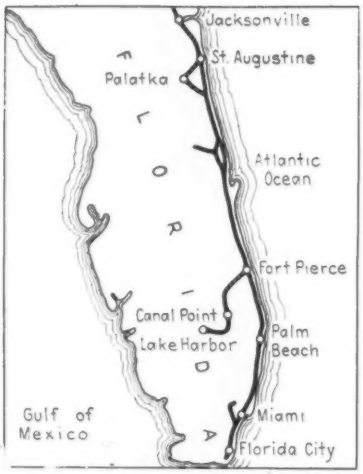
Spans Mississippi with "Ribbonrail"

• The New Orleans Public Belt Railroad recently installed continuous rail on the double-track 4½-mi. long Huey P. Long bridge over the Mississippi river at New Orleans, La., reusing in this work more than 75 per cent of the old rail on the bridge. Since many of the old rails were unusable because of being driver-burned or curve-worn, 427 tons of new rail were required in providing continuous rail entirely across the structure. An Oxweld pressure-welding machine was used to fabricate the continuous rail.

Welding the new rail into 1,326-ft. lengths was the first step in the project. Then, using a string of push cars as the means of transportation, one of these lengths was taken out to the bridge and installed at the beginning of the work. The 39-ft. rails replaced by the first length of new rail were hauled back to the welding location where, after their ends were cropped to remove batter and bolt holes, they were welded into a continuous length. This stretch of old rail was then taken back to the bridge and joined to the previously installed length of new rail, after which another length of new rail was installed. As before, the replaced rails in each instance were taken back for culling, cropping and welding. This procedure was carried through to the end of the work.



The long rails placed on Huey Long bridge were hauled on push cars, as shown here



Above—The Florida East Coast serves an area in which weeds flourish every day in the year. Below—The chemical spray equipment utilized by the road was furnished by General Chemical division of Allied Chemical & Dye Corp.

Conquers Tough Weed

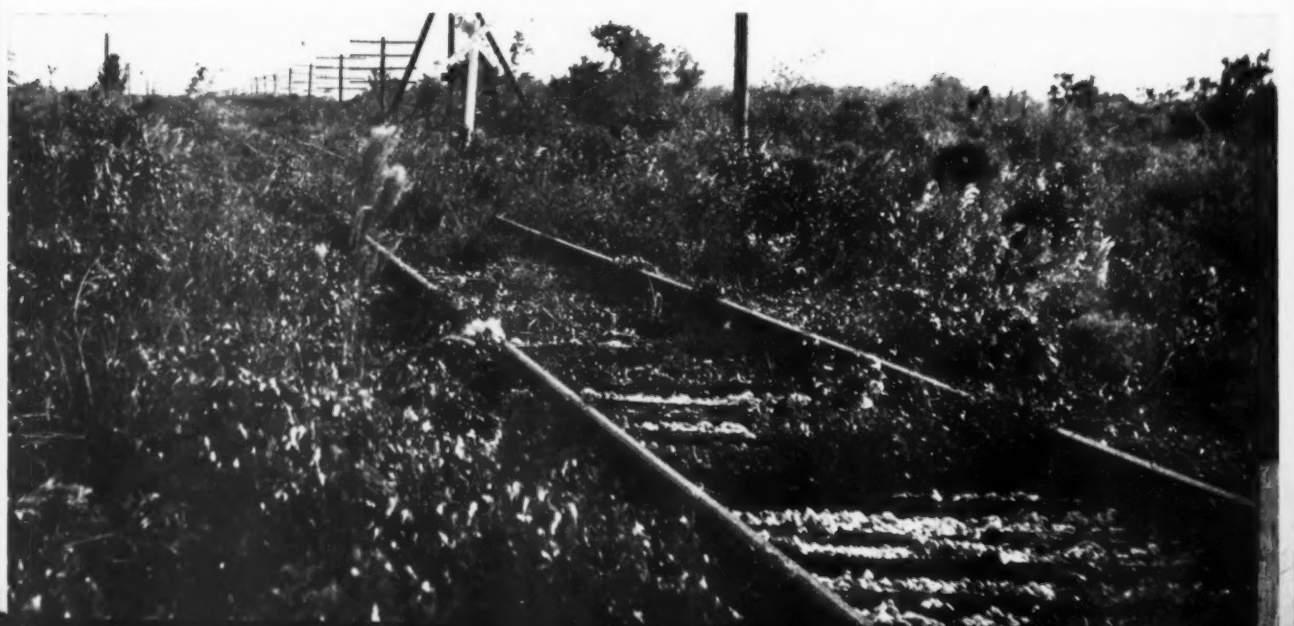
• As the southernmost railway in the United States, the Florida East Coast has a vexing problem in controlling the growth of weeds in its tracks, particularly on the lower half of its lines. Being located in a sub-tropical area, the road has the advantage of serving a territory which produces much perishable traffic, but, for the maintenance men, it means continual warfare against weeds, which flourish every day in the year in this climate.

Since the fall of 1946 the road has made substantial progress in weed control, resulting from several applications of the weed killer known as Formula No. 7*, manufactured by the General Chemical division, Allied Chemical & Dye Corp., New York. Some weeds have been eliminated, others have been definitely retarded, and such new growth that has appeared has resulted largely from residual seed population in the soil. It is anticipated that continued treatment will result shortly in relatively clean track.

An infinite variety of weeds grows in southern Florida, but the chief offenders are Bermuda grass, bunch grass, Para grass, maiden cane, Spanish needle, sand spur, cypress spur, wild morning glory, moon vine and gopher apple (yam family). In the areas where it is found, the gopher apple is particularly pestiferous. It is a low shrub that reaches about a foot in height, with thick foliage of a size and shape similar to oak leaves, and it has a powerful, extensive root system that seems to have no difficulty in penetrating even rock ballast with 20 to 30-ft. root strands, up to an inch or more in diameter. In the muck areas, Para

*As originally introduced, Formula 7 was a compound of very low volatile petroleum aromatic oils containing constituents equivalent to not less than 5 per cent trichloracetic acid, plus 10 per cent acid arsenical supplement 7A.

Below—This section of Florida East Coast track, untreated at the time the photograph was taken, is overrun with a flourishing growth of weeds, while . . .



d Control Problem

In Sub-Tropical Florida

The sub-tropical climate in the territory served by the Florida East Coast is unusually favorable to weeds of all types, which flourish here throughout the year. As a result, this road has been confronted with a number of vexing operating and maintenance problems, and, in addition, the lush growth has been regarded as undesirable from the public relations standpoint, particularly during the tourist season. Chemical control measures, undertaken in recent years, have been highly successful, as described herein

grass grows rapidly to a height of six to seven feet, if undisturbed. The use of weed burners to control Para grass is prohibited because the ground in such areas is often underlaid with peat and there is danger of starting underground fires, which are almost impossible to extinguish and which might spread to destroy many acres of fertile farming land.

Most Annoying Weeds

Spanish needle and sand spur are particularly annoying to train service employees. These plants flourish along yard tracks and the fruit and vegetable packing-house sidings. The sand spur carries many vicious burrs with sharp spikes; the Spanish needle has thin splinter-like needles in large quantity. Both of these plants shed their burrs by the hundreds when disturbed, resulting in an almost endless task for switchmen and others working the packing-house runs in removing them from their clothing.

The first application of Formula No. 7 was made in October, 1946, on approximately 54 mi. of single-track main line and sidings extending south from Miami to Florida City. The results indicated the desirability of continuing such applications, since the vegetation was held in check for some four months, which is approximately the period of heavy shipping from the area covered.

The following autumn, the application was repeated in the same territory, using an improved formulation of trichloroacetic acid (TCA) in oil. A 25-mi. section of the double-track main line north of Miami was also treated at this time, as were 20 mi. of the Lake Harbor branch in the Everglades muck land adjoining Lake Okeechobee, along which are many packing-house sidings. The 1947 application covered some 125 mi.

On these applications, the chemical was sprayed over a 20-ft. swath—10 ft. on each side of the center of the track—or over 2.4 acres per mile of track, using an average of 206 gal. of chemical per mile. In 1948 it was decided to experiment with lighter applications, more frequently repeated, and in May approximately the same territory was covered, using the oil formulation of TCA plus 2,4-D. In this test somewhat less than half the volume of chemical was used per mile. This trial application resulted in destroying much of the foliage, but it was not strong enough to kill the roots, and the regrowth was quite rapid.

Much Actual Kill

In November, 1948, therefore, the application was again at the rate of 206 gal. per mi., using Formula No. 7 mixed with aromatic diluting oil. This application included the 54 mi. south of Miami; the double-track main line between Miami and Fort Pierce, 124 mi.; and 45 mi. on the Lake Harbor branch in the Everglades between Canal Point and Lake Harbor, including all sidings. The main-line tracks are laid on a sand subgrade and are ballasted with native rock. Those of the Lake Harbor branch were originally

. . . this adjacent section of track, in contrast, is relatively weed free, having been treated with three annual applications by spray car of Formula No. 7

ballasted with sand; more recently they have been reballasted with native rock.

This application was the most successful, not only in the areas where the cumulative effect of repeated spraying was being felt, but also in such areas as had not been covered by previous applications. A much higher percentage of actual kill was noted than ever before, amounting to over 90 per cent, so far as the troublesome Bermuda grass was concerned. Also, a four-month period elapsed before seedling regrowth began in any quantity and, except for one type of plant, such regrowth was caused by seeds blown on the tracks from adjacent fields. No amount of chemical seems to destroy the gopher apple, with its extensive root system, but the application did destroy the plant above ground and new shoots did not begin to appear until some months after the application of the chemical.

The Lake Harbor branch is in the Para grass and maiden cane area, and the 1948 application was quite effective against these nuisances, the percentage of actual kill being about as high as with Bermuda grass. On the Lake Harbor branch, the spraying of this tall grass is supplemented by the use of a Fairmont power weed mower along the side slopes of the embankment.

Distribution of Toxic Elements

The chemicals used and described as TCA and oil, known as Formula 7-B, have resulted in the distribution of the following toxic elements per mile of track, 20 ft. wide, or an area of 2.4 acres:

Trichloroacetic acid	– 110 lb. per mi.
2,4-D	– 6 lb. per mi.
Aromatic oil	– 250 gal. per mi.

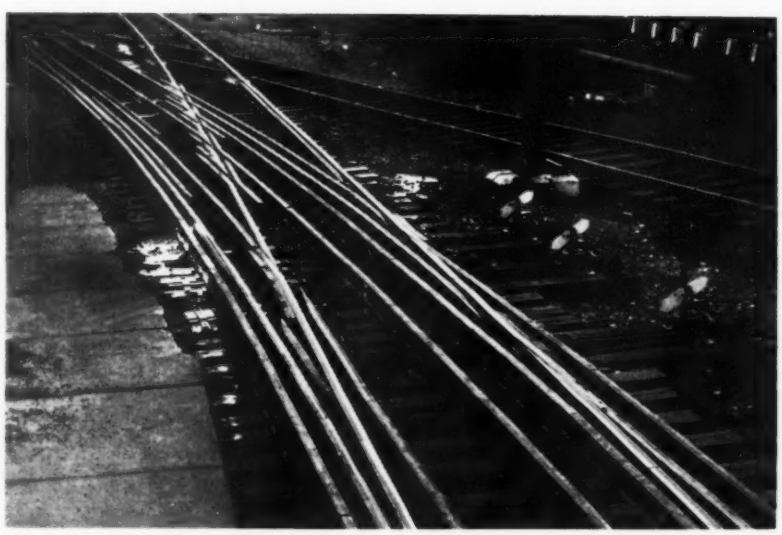
The spray equipment utilized was supplied by the General Chemical division and consists of a box car coupled to tank cars. The box car contains positive-displacement pumping equipment, powered by a Wisconsin gas engine, the pumps being connected to 3-in. suction lines leading to the tank cars, and to 2-in. discharge lines with necessary meters, pressure-regulating devices and spray manifolds. The 20-ft. track section is covered by 12 spray nozzles, mounted near the forward end of the car, four being within the limits of the ties, while the remainder are equally divided between two retractable booms, one boom on each side of the car. One 10,000-gal. tank car serves as a mixing tank wherein Formula 7B is mixed with aromatic diluting oil. The 2,4-D is introduced into the spray line in such a manner that it can be shut off immediately. Thus, when the spray train passes agricultural areas with susceptible crops, any 2,4-D spray drift may be eliminated.

Results of Treatment

From December, 1948, until May, 1949, the track treated may be described as weed and grass free, with the single exception of patches of gopher apple. Beginning with June, 1949, and the tropical rainy season, miscellaneous seedling growth appeared. A detailed inspection in August showed that 90 per cent of the original growth, including maiden cane, Para grass, Johnson grass, Bermuda grass, Spanish needle, horse nettle, wild grape, southern honeysuckle, napier grass and Sudan grass, had been completely eradicated, and that the seedling regrowth consisted mainly of upright spotted spurge, which is an annual in northern climates. The patches of gopher apple remained, but these had not enlarged or increased in area, and in some cases were thinned out. It has also been noted that the treatment has prevented the encroachment of established vegetation beyond the spray limits to the areas within those limits.

Prior to 1946, the Florida East Coast had not used chemical weed killer for 12 years and, therefore, a seed population had built up in the soil, much of which had not germinated due to competition and to shelter from sunshine by the foliage of the original infestation. It appears, as is usual under these circumstances, that the upright leafy spotted spurge had germinated because of the removal of competition and exposure to direct sunlight. A fourth application was made in October, 1949, primarily to eliminate the spotted spurge, and it is expected that this was accomplished, as this plant is not rated as unduly resistant. It may be anticipated that with the exhaustion of the residual seed population, relatively clean track may be realized shortly.

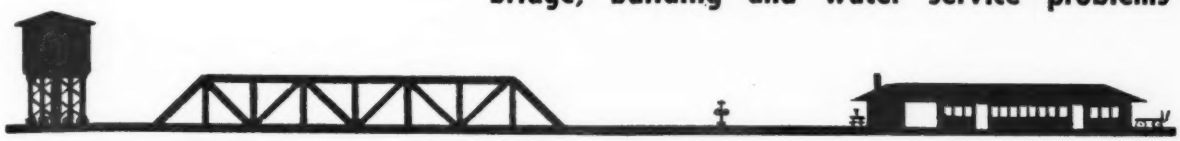
Weed-killing operations on the Florida East Coast are conducted under the supervision of J. H. Morgan, engineer maintenance of way, St. Augustine, Fla., in cooperation with the weed killer department of the General Chemical division.



MULTI-GAGE PUZZLE SWITCH—The track supervisor's nightmare shown here is located at the General Electric Company's works at Erie, Pa., where electric and Diesel locomotives for the export trade and for domestic use are built and tested. This complex switch at the plant end of the test track handles nine different gages. These include: 30 in. and 36 in. (used in the Americas); 39.37 in., or meter gage, (used in many countries); 42 in. (Japan); 48 in. (industrial use); 56½ in. (standard in U.S. and Britain); 60 in. (Russia and Panama Canal Zone); 63 in. (South America); and 66 in. (South America and India). Only four switch controls are required to handle any movement through the switch.

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Necessity for Cleaning Yards

To what extent is yard cleaning necessary? How can this be done effectively? Explain.

Hand Cleaning Too Expensive

By R. V. Dangremond
Roadmaster, Elgin, Joliet & Eastern, Gary, Ind.

Yard cleaning is done in direct proportion to the extent of any railroad's safety program. However, several factors govern the extent to which yard cleaning is necessary. Some of these factors are: (1) Types of spillage found, i.e., whether it is rough, such as coke, coal, ore, stone, gravel, etc. or fine grained, such as sand, flue dirt, cinders, etc.; or (2) whether the spillage is evenly distributed, or in piles. If the material is not a safety hazard, it might have to be removed to facilitate track maintenance or possibly tamped under the track when out-of-face surfacing is done. Whether the material accumulates in a classification yard or a storage yard has some bearing on the extent to which cleaning is necessary. The type of yard involved may also determine the frequency of cleaning.

We have found it necessary on our railroad, in the interest of safety and economy in track maintenance, to clean most of the tracks in our classification yards to the level of the top of ties at least once a year, and some of the tracks in these yards as often as four times a year because of heavy spillage. In storage yards we find that cleaning them down to the top of tie once a year is generally sufficient.

The walkways along the leads in our busy classification yards are cleaned daily by two or three men who cover the whole yard for this specific purpose and throw the material into the center of tracks behind or adjacent to the leads. We must do this to eliminate tripping hazards caused by constant spillage.

To accomplish yard cleaning as outlined above, it has been necessary to work a gang of 35 to 40 laborers with a foreman and an assistant foreman in each of three large yards on one division of our railroad during the 7 to 8-month season when there is no frost in the ground, and gangs with 12 to 15 laborers each during the winter season. The most efficient method to clean yards with these gangs has been found to be with 10 or 12 two-yard hydraulic dump boxes mounted on push cars, which are loaded by hand and hauled by motor car to a conveyor located at an easily accessible spot. Here the dump boxes are dumped and the material elevated into a gondola for further disposal by crane on a dump track.

Because cleaning yards by such hand methods is expensive, especially since the advent of the 40-hour week, a great opportunity exists for the development of mechanized methods of doing this type of work.

Cleaning Is Very Important

By N. F. Alberts
General Track Foreman, Chicago, Milwaukee, St. Paul & Pacific, Chicago

The expression "yard cleaning" does not seem to impress many railway officers and such work has seldom been regarded by them as

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the April Issue

1. What men in the track department should be examined on railway operating rules and on safety? How thorough should these examinations be, and how often should they be held?

2. What are the advantages of using a cushioning material between the steelwork of bridges and its supporting masonry? What special features should the material have for this service?

3. Is it advisable to clean crib ballast as frequently as shoulder and intertrack ballast? If not, what relationship should obtain? What considerations are involved?

4. What are the relative advantages of fluorescent, incandescent and mercury-vapor lighting in railway buildings? Where can each type be used to best advantage? Can they be used with special benefits in certain combinations? Explain.

5. What are the advantages and disadvantages of having annual switch inspections? When and by whom should they be made? What should be covered? Explain.

6. Under what conditions, if any, is it satisfactory or desirable to place the operation of water stations in charge of agents or other employees? What are the advantages or disadvantages?

7. What are the latest developments in brick-laying devices? To what extent are they adapted to use by railway building forces? Explain.

important. Yet it is as important a task as most other track-repair work needed to maintain a railroad. It represents neatness and good appearance, and insures the safety of other classes of workmen.

It has been my practice until recently, when economic conditions forced us to dispense with the task of yard cleaning, to have men assigned the year round to keep switching leads, running tracks, team tracks, station grounds, and building surroundings in a neat condition.

We have scheduled this work for the assigned men as we schedule all other track-repair work. The men assigned to cleaning work, after being told what was wanted, have proceeded systematically to keep station grounds, yard leads and other yard facilities in a very presentable condition.

The work assigned to a yard cleaner does not, however, include the occasional spill of a part load of coal, cinders, sand, etc., which might be dumped on a lead or track by a defective car. Such work would, of course, have to be done by a larger force of men.

Assigned yard cleaners have been confined to yard running tracks, ladder tracks, building surroundings, station grounds, and team tracks, taking care of any foreign materials accumulating on the property form time to time.

In the early spring, often as early as the first part of March, or whenever weather conditions become favorable, a special drive is made to go over our railroad facilities and clean the premises of all litter, coal, sand, cinders, and such other foreign material as may have accumulated during the winter.

We use the greater part of our track forces to do this work and devote the greater part of March and April to it. Consideration is given first to our main-line tracks and interlocking plants. Next, we handle our station grounds, team tracks, switching leads, running tracks, and finally our yard tracks. In this drive we do a thorough job of cleaning, after which the yard cleaners are expected to maintain the property in a neat condition at all times.

The disposal of the material gathered in the spring clean-up is decided by local conditions. On our main tracks we endeavor to dispose of as much of the material as possible along the right-of-way. Since our main tracks are elevated in this area, it is difficult to use trucks for this purpose. When such disposal cannot be made, we pile the material along our freight tracks. If it is to remain there overnight or for a few days, a "lookout" order is issued to all concerned—thus reducing the probability of anyone getting injured. The material is then disposed of either by loading it into a gondola with a crane equipped with a bucket, or by the use of five or six heavy-duty push cars equipped with dump boxes that are hauled by a heavy-duty motor car to points where proper disposal can be made.

The material recovered along yard leads, running tracks, team tracks, station grounds, and building surroundings is loaded into company-owned trucks or trucks furnished by contractors. In congested areas where trucks cannot be operated, the motor-car outfit mentioned above with five or six push cars is used—or the crane and clamshell bucket will pick up the material and load it in gondola cars.

The cleaning of yard tracks is generally handled by taking two tracks out of service while the cleaning is in progress, loading the material into gondola cars with crane and clamshell bucket. If a crane is not available, the motor-car and dump-box method has been found satisfactory.

Cleaning Reduces Hazards

By William Lindsay
Yard Foreman, Chicago & Illinois Midland, Pekin, Ill.

A clean yard indicates "good housekeeping" on the part of the foreman. Such good housekeeping cuts down the hazards that might result in injury. This is especially true at night or at other times when there is a minimum of light, but, night or day, clean yards present a good appearance and increase safety.

In a medium-size yard the most efficient method of cleaning is to rake or shovel the material into large piles conveniently close to the track, yet far enough away so as not to form a hazard for workers in the yard, and then remove the piles by truck or crane, depending on the amount of spilled lading, refuse, paper, etc., that has accumulated.

In a large yard, this might not prove to be the most efficient method because of the inaccessibility of some of the inside tracks. However, at such locations where trucks are provided for track gangs, a temporary crossing of ballast, boards, or other available material, could be built leading from the outside track. By picking an opportune time for loading, such an arrangement might get the job done earlier and reduce the time the debris would remain as a hazard.

Mechanization Imperative

By George S. Crites
Division Engineer, Baltimore & Ohio (Retired), Baltimore, Md.

Clean yards are safe yards. Also, rail and appurtenencies deteriorate less rapidly when kept free of dirt and cinders, and tracks where there are interlocking or track circuits must be kept clean if they are to function properly. Yard cleaning is necessary to the extent that yardmen should not have to wade through grass and weeds in the performance of their duties, trip over scrap or rubbish or step into water and slip on mud. Track circuits should not short circuit, nor interlockings foul up.

Vigilance is always necessary to keep yards clean. Metal scrap should be gathered up and put in a safe place whenever found, but always ahead of a general cleaning. If carmen drop their materials in yards, such materials should be delivered to their place of work and proper charges made against their department. Not all that is thus recovered will be scrap.

In territories where there is ice and snow, yards will be dirty in the spring and must be cleaned systematically. Ladders should be cleaned first in order to reduce hazards. This can be accomplished by gangs shoveling dirt into piles, followed by cranes for loading the piles into trucks or dump cars for disposal. It may be necessary to have good, porous filling material available to smooth out holes and fix paths.

In the body of yards, track forces should be given three tracks at a time for mechanized cleaning. In coal yards, it may be necessary to run a spreader to windrow debris between tracks, followed by a crane served by trucks or dump cars for dis-

posal of the material. Cleaning organizations should be efficient enough to justify taking tracks out of service without increasing yard expenses beyond the savings made by mechanized cleaning.

When labor was less costly, yards could be kept clean by small cleaning gangs casting or carrying scrap, rubbish and debris from ladders and the bodies of yards to places assigned for loading or disposal, but this method is now uneconomical. New yards should be laid out with dirt removal in view, and often in old yards it is necessary to remove every eighth or tenth track in order to secure room for accumulating dirt, rubbish and scrap for final disposal. Off - track disposal machinery should be figured for.

Where weeds are a bother, chemical treatment should be used in an effort to sterilize the ground against plant growth. Growing weeds must be burned with proper equipment. When burning is done, a general cleaning should follow because it will be surprising how much scrap and debris the weed burning will uncover. All this should be done efficiently so as to interfere as little as possible with switching operations in the yard.

Methods of Housing Power Tools

What is the most effective manner of protecting small roadway machines and power tools from the weather and vandalism when it is more convenient and less costly to leave them at work sites along the right-of-way? Explain.

Boxes Have Many Advantages

By R. A. Hostetter
Inspector M. W. Roadway Machines and Equipment, Texas & New Orleans, Houston, Tex.

By 1936 the demand for small tools, such as two and four-tool tie tampers, both electric and pneumatic, small electric plants, chain saws, rail saws, rail drills, small water pumps, and small electric tools, including concrete vibrators, etc., for use on section and bridge gangs became of supreme importance in the operation of our railroad. Such importance has grown in proportion to increases in labor costs, until we now have some type of power tool with almost every main-line section gang and with all bridge and building gangs.

Early in our use of small power tools it was found that much time could be lost in transporting these machines from headquarters to the points where the gangs were to work, especially where the gangs continued to work in the same location. The supervisor of equipment on our lines quickly realized this loss in time and effort and designed a suitable protective roadside box for the four-tool electric tie tampers. This box is 25 in. wide, 45½ in. long, 26 in. high at the back, and 36 in. high at the front, and has lift handles on each side. A door, at the front, is hinged from the bottom and locks at the top. When the door is lifted and locked the box becomes a weatherproof house for the equipment. The boxes are made of ⅝-in. plywood and are well painted. The tamping tools are placed in another box, 30 in. wide, 44¾ in. long, and 30 in. high, with a lid opening on the top. The four tampers fit into the bottom portion, while at the back, upper part of the box, there is a tray built in for use in storing greases, oils, spare parts and parts books. This box is also made of ⅝-in. plywood with handles on the sides for easy handling. These roadside boxes have proven such a success that we now have 130 of each type for electric tampers alone.

Two-tool pneumatic type tie tampers are housed in a plywood box built by mounting the compressor on the bottom of the box and hinging the entire box from the bottom by unlocking the box at the bottom front side. It can be lifted back over the compressor, making the compressor quickly available for use. Tamping tools, hose and greases are contained in a small roadside tool box, 48 in. long, 36 in. wide and 36 in. high, that has a small tray built in the back, upper portion. This also is built of ⅝-in. plywood, with lift handles, and hinged lid on the top.

The smaller electric plants used by our B. & B. gangs for lights, small power tools and chain saws are all housed in similar roadside boxes, all being made by our shop under the supervision of the supervisor of equipment. It has been found that ⅝-in. plywood is best suited for building these boxes because with this material a water repellent house can be quickly built at a nominal cost. Some of the advantages of such a box are: (1) It can be repaired quickly; (2) less labor is required to load and unload the equipment when carrying it into headquarters; and (3) the hazard of carrying unhoused power tools on motor and push cars is eliminated.

We have not experienced a single loss due to vandalism to our equipment that has been protected by our roadside boxes.

These boxes serve another very useful purpose—that of protecting this equipment when it is being shipped from one location to another. All that is necessary is to place the equipment in the box, lock it and tag it. Necessary blocking is attached within the box to prevent the equipment from shifting around. The boxes are all built sturdily by using steel angles, and are bolted together with ¼-in. carriage bolts, using heavy hasps and hinges.

Canvas Covers Are Effective

By S. E. Tracy
Superintendent of Work Equipment, Burlington Lines, Chicago

The correct and complete answer to this question can best be given only by the local supervisor or foreman who is well acquainted in his community. Experience over a period of time will make it possible to determine whether it is more economical to haul roadway machines and tools to and from work sites every day or leave them in the field at night. It is always more convenient to leave small roadway machines and power tools at work sites along the right-of way and, in general, it is more economical to leave them at the location where they are being used for a specific job, if it is the intention to continue with that work at or near the same location on the following day.

Most roadway machines are designed for use in all types of weather but will give better service and longer life if protected by a canvas cover while not being used during the day or when in storage at night. A canvas cover

designed for the type of machines to be protected will tend to reduce vandalism to the machine and the theft of the protection.

Power tools and the small accessories used with roadway machines can be protected from the weather by a canvas cover, but if such tools or accessories can be used or are readily converted to universal service, they should not be left on the right-of-way at night unless locked in a tool box or container of sufficient size and gross weight to provide transportation difficulties. Locks do not prevent theft or vandalism, but they make it more difficult for the thief and discourage the kleptomaniac and the vandal. Vandalism by those outside of the local community may be minimized by placing equipment at a location where it cannot be seen from a heavy-traffic road or highway.

The color of the paint used on roadway machines and the type of metal used on many power tools tends to make them conspicuous, inviting vandalism and theft. A good camouflage, such as a water-repellent canvas cover, and some thought in the selection of a storage site, will reduce both vandalism and theft and will provide ample protection for most of the small roadway machines and power tools.

Distributing Ballast Uniformly

What are the major factors involved in the distribution of ballast? What effective means or devices can be employed to secure uniform distribution? Explain.

Pans Save Rehandling

By H. F. Tupper
Division Engineer, Boston & Maine, Dover, N. H.

The major factor involved in the distribution of ballast is to be able to dump just the required amount of ballast for the work to be done, whether the job is that of adding new stone ballast or resurfacing the track with stone, cinders or gravel. The amount of ballast to be applied depends wholly on the lift or raise to be made in the track, assuming that adequate shoulders are already provided. If the exact amount of ballast is dropped, much labor is saved in the handling of the material, such as picking up extra material, dropping additional material, leveling the cribs between the ties, and shaping shoulders.

We have found that ballast pans leased to us by a manufacturer are very helpful in our stone-ballast work. Such pans are rectangular trays of steel or an aluminum alloy, which are provided with chain hangers which support the pans under car hoppers from the upper rim of the cars. The trays have doors to control the amount of ballast deposited between the rails, and slides at the ends for shoulder work. These doors and slides are operated manually by convenient levers at the ends of each pan outside the limits of the car.

In "dragging" ballast by this method, enough cars of material are placed in a work train for a programmed day's work. Two pans are placed under the hoppers of each of several cars. When a car is emptied, the pans are withdrawn from under the hoppers to the outside shoulder, the train is moved until the hoppers of a loaded car are opposite the pans, and the pans are then slid over the rails, under the hopper, and adjusted for height, generally 3 or 4 in. above the top of the rails. This operation can often be postponed until the train has to clear up on a siding, and then no productive time will be lost making the change. The train is then ready to continue distribution.

A stone-ballast distribution outfit, as we use it, consists of a work-train locomotive and caboose, hopper cars of material, at least six ballast pans, an extra-crew track foreman, an assistant foreman, and eight trackmen. Two trackmen are assigned to handle the pan levers actually distributing the ballast, one working under the direct supervision of the foreman on one side of the train and the other the assistant foreman on the opposite side. A trackman with a lining bar and hammer prepares the hoppers for dumping and dumps the hoppers as required. These ground men handle the setting and removal of the pans, as necessary. Five men with shovels are employed in the car itself to assure a constant flow of material down into the hopper bottoms and onto the pans.

When the day's distribution is completed, all pans are removed from the cars at the site of the last dumping, and the train is released. In the morning the train moves to the job with full cars of material, picks up the pans at the point where they were left, and is ready for work. We lose very little work-train time by using this setup.

In dumping stone ballast for resurfacing we attempt, with fair success, to distribute our material so that when the raise is made there is just enough stone to tamp under the tie fully, fill the cribs to within 1½ in. of the top of the tie, and make our shoulders.

Hang Pans From Cars

By James S. Becker
President, Scientific Production Corporation, New York

The first major factor in the distribution of ballast is consideration of the variation of requirements. Most ballast is transported in coal-carrying hopper cars, the flow from which will not cover the entire ballast section. Therefore, special equipment is required for lateral spread and longitudinal control as the requirements change. Because many types of hopper cars are usually used in ballast service, control equipment must be adaptable to all types in common use. It must be light in weight for easy handling and rugged enough to withstand the impact and abrasive wear of stone ballast. A high safety factor is essential because of the possibility of a derailment in the event of a failure under the moving cars.

Another factor is the availability of track. Since most maintenance ballasting is necessarily required on heavily traveled track, it is essential that ontrack time be kept to a minimum without going beyond the point of reasonable return. The problem is to distribute the material in correct amounts where it is needed, and to clear the track as soon as possible. It is not practicable to cut limited distribution time at the expense of a sloppy or wasteful job.

Conservation of material is another factor. Large volumes of

stone can be wasted by overfilling cribs, and spilling over shoulders and down embankments.

Labor costs are a major factor. Labor rates are up 300 per cent since ballast spreading equipment has been available. Forking stone has not become any less difficult, remains expensive, and is the only method of reworking a sloppy distribution job.

The total distribution cost should, of course, be the determining factor in selecting a competent method. Comparable cost studies can be made in which material, labor, dressing and rework are all considered. When special ballast cars are used it must be remembered that, when purchased in quantity, they involve a large sum of money, interest on which may add up to 50 per cent of the original cost. Idle time and repair costs are also factors with this type of equipment, as well as the cost of hauling the empties to the quarries. With an attachable device, any coal-carrying hopper car in the vicinity of the ballast quarry can be spotted for ballast service.

For raises less than 8 in., a spreading device is effective when coal-carrying cars are used. The flow must be regulated by equipment that can cover all or part of the cross section needed. This equipment should be installed on several of the cars in the ballast train so that as one car starts to run out another can be gradually cut in to yield a uniform amount in the track without stopping the train and backing up to make another pass.

For most effective results a ballast spreader should have six selections, with individual controls: Two between the rails; two outside the rails; and two beyond the ties. This is necessary where uniform distribution is required because the flow of ballast from the individual and collective cars is a variable and the amount of the section to be covered varies as bridges, switches, water pans, crossing, etc., are encountered. The only device available with these essential controls is one that is hung from the top of the car. It is easily installed in several minutes and is adjustable in height from the top of rail. It can be applied to the loaded cars in the yards and pulled up against the hoppers for security while on the way to the site. It is then lowered enough to allow clearance for the hopper doors but not enough to scrape train control inductors or grade and station crossings.

The hanging type ballast spreader has been effectively and economically used many years for controlled distribution in maintenance service and for uniform distribution in light construction service.

No More, No Less, No Move

By F. R. Miller
Supervisor Track, New York Central, Kalamazoo, Mich.

The distribution of ballast is a very important part of the maintenance and appearance of track. For this work we have a number of proprietary-type ballast cars, which are very satisfactory in every way. These cars may be handled by two experienced men at the rate of 8 to 10 cars an hour. We find that when using both sides of this type car by placing boards directly behind the chains controlling the trap doors, we are able to unload ballast for lifting and also for trimming.

We also use hopper cars for handling ballast and unload them by placing a pan at the bottom of these cars. By this means we can unload 4 or 5 cars an hour.

Unloading ballast is a very expensive operation, unless you get the ballast in the right places in the right amount.

Incising Lumber and Timber

What are the advantages and disadvantages of incising lumber and timber prior to treatment? Under what conditions is it advisable? Explain.

Incised Timber Lasts Longer

By J. O. Blew
Technologist, Forest Products Laboratory, U. S. Department of Agriculture, Madison, Wis.

Lumber and timbers are incised prior to preservative treatment primarily for the purpose of improving the penetration and distribution of the preservative. The incising operation involves moderate reduction in the strength of the timber but for most purposes this is not important and the incising of ties, poles, and other timbers is widely practiced.

During the incising operation holes are punctured in the surface of the wood. These slit-like holes are ⅛ in. or less in width, and vary from ¼ in. to ¾ in. in length and from ⅜ in. to ¾ in. in depth.

The incising is done generally with machines. For sawed lumber and timbers, the machines are fitted with two pairs of drum rollers studded with replaceable incising teeth. The timber is passed between the rollers which are forced by heavy pressure against the four wood surfaces. Incising machines for poles are of a somewhat different design and generally puncture a series of narrow bands of holes as the poles are turned in the machine. The poles may be incised full-length if they are to be pressure treated, but they are generally incised in a band approximately three feet wide at the ground-line zone since it is that part of the pole which requires the maximum protection of the preservative.

The longitudinal or along-the-grain penetration of preservative in wood is usually several times greater than that transversely or across the grain. As a result of puncturing numerous, carefully spaced holes in the surface of the wood the opportunity for longitudinal penetration of the preservative is increased and it is often possible to obtain complete penetration over the entire surface of the wood to the depth of the incising holes. This is particularly advantageous in woods resistant to treatment, such as the heartwood of Douglas-fir and several other species. The penetration of preservative is improved also in cedar poles as a result of incising since the sapwood of this species is resistant to treatment. In lodgepole pine, the sapwood of which is easily penetrated, poles are frequently incised at the ground line prior to nonpressure treatment. It is thought, in this case, that incising helps to improve the distribution and concentration more than the depth of penetration of the preservative at the critical ground-line zone. The penetration of the

preservative in the sapwood of Douglas fir and western larch is improved through incising when poles of these species are to be treated in open tanks without pressure.

Although incising results in some reduction in the strength of timbers, the benefits resulting from the improved treatment are considered to more-than-offset this disadvantage. Specifications generally limit incising to lumber that is three inches or more in thickness because thinner material is more likely to be splintered or otherwise made unsuitable for its intended use.

Gives Uniform Penetration

By A. J. Loom
General Superintendent Timber Preservation, Northern Pacific, Brainerd, Minn.

After many years of investigation and experimental work at various treating plants and at the U. S. Forest Products Laboratory, the advantages of incising are recognized to the extent that it is recommended in treating specifications of the American Railway Engineering Association, the American Wood Preservers' Association and Government agencies.

From my own experience in the treatment of the various species of wood used by the Northern Pacific, I believe the principal advantage of incising to be the resultant improvement in uniformity of the penetration and distribution of preservative in all species we have treated. We have found it of special value in obtaining the required penetration and absorption of preservative in Douglas fir, of which the Inland Empire species is the most refractory of any of the woods we treat. In experiments with matched pieces of West-Coast Douglas fir treated under indentical conditions, the incised pieces absorbed more than 40 per cent more preservative than the unincised pieces. Penetration in all species of wood is more uniform to the full depth of the incisions.

Tests conducted by the Forest Products Laboratory indicate that incising results in a slight reduction in strength of Douglas fir products, cedar pole butts and certain other woods used for crossties, but the disadvantage of this loss is considered to be more-than-offset by the increase in protection resulting from the improved absorption and greater uniformity of penetration of preservative.

For the reasons mentioned it is our standard practice to incise immediately before treatment all crossties and switch ties of each species used, and also all rectangular Douglas fir bridge material and timbers more than two inches thick.

Tests made to determine the effect of incising on the air-seasoning of green maple, birch and beech ties indicate no appreciable effect on the rate of drying of the wood, but it has been observed that there is slightly less checking in ties that have been incised before any appreciable number of large seasoning checks have appeared. A large portion of our ties are partially seasoned when they arrive at our treating plants, to the extent that checking has already started. Therefore, in my estimation, incising before they are piled in the seasoning yards would not prove of enough advantage to warrant the extra cost of handling.

Obviously, it is not advisable to incise all materials regardless of dimensions, purpose, species of wood, complicated preframing, etc., but when performed in accordance with A.R.E.A.-A.W.P.A. recommendations, I have observed that the advantages of incising before treatment, to the extent referred to, are clearly evident.

Air Compressors for Large Bridges

What are the relative advantages of using small portable air compressors, or fixed pipe lines and permanently located air compressors for cleaning the larger bridges? Explain.

Small Compressors Better

By S. F. Grear
Assistant Engineer of Bridges, Illinois Central, Chicago

Small portable compressors have very distinct advantages over a permanent compressor and pipe lines for work on large bridges. A situation where a permanent installation is justified would be very unusual.

At our bridge over the Ohio river at Cairo, Ill., we have had a permanent installation for many years, this being due to rather constant repairs to the steel and to the timber deck, rather than for cleaning and painting.

Originally we had about 8,000 ft. of pipe line, with a gasoline-driven compressor at each end, and, at times, another compressor in the middle. Owing to the reconstruction of a part of the bridge, this line has now been shortened to about 4,000 ft., with an electrically-driven compressor at one end. This construction is feasible as we have a bridge gang at this point permanently, and we also have 24-hr. watching service, so we are not troubled by theft or vandalism. The compressor is housed for protection from the weather.

I know of no other location on the Illinois Central where such a set-up could be justified. Paint gangs work only a few months at a time on any structure and compressors and pipe lines should be removed for protection. Compressors should be kept as close as possible to the work to prevent losses of pressure through long air lines. Also, the cost of a larger compressor and longer lines would result in a much larger investment.

The permanent set-up has some advantages in that the compressor can be housed; and, if gasoline driven, it is not necessary to handle gasoline on the bridge structure. In my opinion, however, these do not offset the disadvantages.

Uses Portable Compressors

By Chief Engineer Maintenance

On my railroad, for cleaning large bridges, we prefer small, portable compressors mounted on wheelbarrows. This preference evolved from a study made a few years ago to determine the most economical and flexible mechanical means of cleaning bridges, with particular attention to a location where a number of double-track bridges, consisting of deck girders, deck trusses, and through trusses, crossed a river within a radius of one mile. The study was started primarily because of in-

creasing labor costs and the hazards involved in having men climb around these structures to remove accumulations of cinders and dirt from bridge seats.

On the basis of this study, compressed air was finally adopted as the best means for doing the work. After investigating the cost and future maintenance of permanent compressors and pipe-line installations at these bridges, it was decided to equip a small gang of two or three men, depending on the nature of the work and the need for a watchman, with a small portable compressor, air hose, and various lengths of ½-in. pipe nozzles. Long pipe nozzles enabled the men to reach the bridge seats and other spots from the deck of the bridge, thus eliminating the need for climbing. The compressor can be wheeled from job to job, thereby eliminating the moving and assembling of hose lines.

Such a set-up has proved to be economical and efficient, and future maintenance and replacement costs will be small in comparison with installations of a permanent nature.

Corrugated Translucent Skylights

To what extent are translucent building panels adaptable for use in place of windows and for skylights in railway buildings? Explain.

Plastics Now Available

By Engineer of Buildings

Although relatively new, translucent panels are rapidly becoming well established as a building material for use in both construction and maintenance. They are as well adapted for use as windows and skylights in railway buildings (and for other purposes too) as other materials may be. In many cases they are probably better suited to such use. There are at least two major products of this nature that are being manufactured to admit light to either present or new buildings.

One of these is classed as a polyester resin combined with inert glass fibers that can be molded to match the corrugations of any of the metal or asbestos-cement roofings or sidewall materials.

This material is weather resistant, is shatter-proof, can be nailed without shattering, can be drilled, sawed with a hacksaw or power saw, and can be bolted in place with standard roofing straws or lead head bolts. Since it is made to nest with corrugated roof or siding, no framing or flashing is required.

Since framing is unnecessary, it is easy to install in an existing building by removing the sheets of roofing or siding and slipping in sheets of the translucent material, fastening them to the purlins in the usual way. Such ease of installation permits the use of a normal maintenance crew and lowers the cost of the installation.

The other new product available for skylights and windows is an acrylic, thermoplastic material which, when heated above 212 deg. F., can be formed to almost any shape or curvature to match the corrugations of roofing or siding materials. This material is light, weighing less than half as much as glass. It is easily machined, making it possible to bolt sheets of it directly to corrugated metal or asbestos-cement sheets, eliminating the need for sash. It has dimensional stability, a high degree of light transmission and diffusion, and is shatter resistant. Finally, it is unaffected by outdoor exposure.

A typical example of the use of this material for skylights was in the field house at the University of Delaware. There the plastic was matched to corrugated aluminum sheathing. Each skylight measured 18 ft. by 5 ft., and was made up of 36-in. by 60-in. panels, ⅛ in. thick. These were joined at the edges by overlapping 1½ corrugations and bolting the panels together, using oversized holes and special resilient grommets to take care of expansion and contraction. Each of the 15-sq. ft. panels weighed only 12 lb. For windows in buildings, such as tool houses, freight houses, enginehouses, or other buildings at which boys might throw stones, this plastic is ideal. Furthermore it is available in a flat sheet if desired. Such sheets are crystal-clear, having a light transmission value of 92 per cent.

Salt for Regenerating Zeolite Beds

Why must the salt used in the regeneration of Zeolite water softening plants conform to certain specifications? How do these specifications differ from those of ordinary rock salt used for melting snow?

Must Have 98 Per Cent NaCl

By E. R. Schlaf

Assistant Superintendent Water Service, Illinois Central, Chicago

Salt used for regenerating Zeolite beds should be free of insoluble substances because of the mechanical difficulties which will otherwise result if used continuously. Regenerating salt should be at least 98 per cent chemically pure for two reasons, the first being that of getting the most sodium chloride per unit of cost, and the second, and probably more important, that the presence of calcium and magnesium salts has a deleterious effect upon the regenerating ability of the sodium chlorides. For example, salt containing 2 per cent of calcium or magnesium chloride will necessitate 5 per cent more by weight of the regenerating material. This tendency increases as the purity of the salt decreases. The size of crystal is another item to consider if a high rate of solubility is a factor.

The type of rock salt used for melting snow can be of low grade and still be satisfactory. Calcium and magesium chlorides as impurities in salt used for this purpose have the advantage of depressing the freezing point, but the slight disadvantage of being more corrosive to metal. In the amounts generally present, this tendency would be negligible. Insoluble impurities, such as lint, chips and stones would not be objectionable for this purpose, whereas they would be detrimental if used in water softeners.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 103)

TRUCK BODY HOIST

GAR WOOD Industries, Inc., St. Paul Division, Minneapolis, Minn., is introducing into the railroad field its hydraulic truck-body hoist, known as the Dump It, which can be applied to any truck with a fixed body to convert it into a dump body. Trucks equipped with this hoist may be used for the hauling and rear-end dumping of ballast, sand, gravel, ties, tie plates, frogs, logs, lumber and other materials.

Essentially, the Dump It hoist embodies a full-length steel channel subframe, a hydraulic hoist mechanism, two lifting arms, a steel-channel body frame, a power take-off, and cab controls. The subframe is mounted on the truck chassis and supports the hydraulic hoist mechanism near its midpoint. The body frame supports the platform of the truck body and is connected to the rear of the subframe channels by malleable iron hinges. The lifting arms, actuated by the piston of the hydraulic mechanism, cause the body platform to be tilted to the dumping position.

The Dump It line of hoists is made in four models: Colt, Pony, Mustang and Stallion. All models are furnished with an automatic safety lock which holds the body in the "down" position until the operator pulls a lever to release it. A safety overload valve is standard equipment on the hydraulic mechanism of all models and protects the hoist and truck from damage if too great a lift is attempted.

The manufacturer states that trucks of all makes, including those already in service, may be converted into dump types by removing the body, installing a Dump It hoist on top of the truck frame, replacing the body sills with steel channels that are furnished with the hoist, and remounting the body. In most cases, it is claimed, the addition of the hoist will not increase the loading height of the body above the ground.

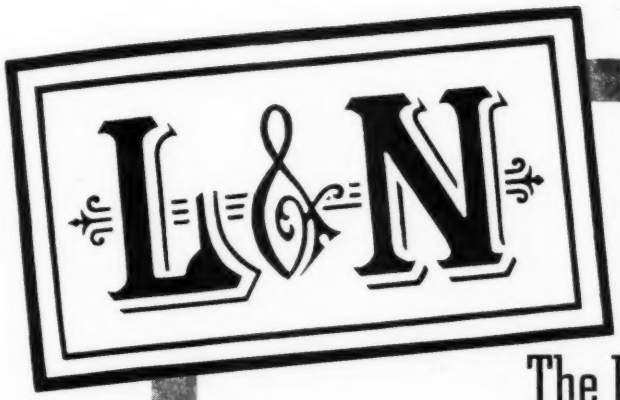
Truck fitted with Dump It hoist handling snow on Chicago & North Western System

The St. Paul Division also manufactures three types of truck bodies, which it is offering for use in the railroad field. One, known as the St. Paul All-Steel Stake Platform type, consists of a floor, 95½ in. wide and in lengths from 8 ft. to 16 ft., formed of 10-gage sheet steel welded to a body frame which is made up of welded 5-in. longitudinal channels and 3-in. channel cross bolsters. Stake pockets are provided in the sides, the front and the rear. On quantity orders, the manufacturer will supply sides, ends, seats, canvas canopies, etc., to meet the requirements of the purchaser.

Another type of body, known as the St. Paul Type DS (drop-side) body, is designed primarily for hand loading of bulk materials. As its name implies, it has drop-away hinged sides, and a double-acting tailgate. Seats and canopy are optional equipment with this body. The third type of body, known as the St. Paul Type C body, is a combination dump

(Continued on page 156)

The St. Paul Type DS body with drop-away hinged sides



The HISTORY of the L & N
is the History of Democracy!

. . . Why do "Dictator" countries—some with far greater land areas than the United States — have fewer miles of railroad today than we had 100 years ago, when the L & N was born?

. . . Because America believes in allowing individuals — and business — to grow. Such institutions as The Louisville and Nashville Railroad, and the communities it serves, have grown and prospered amazingly under this way of life.

. . . And the amazing story of America's growth is written in the same spirit — the people of America have allowed their *country* to grow!

WOODINGS FORGE AND TOOL CO.
WOODINGS - VERONA TOOL WORKS
VERONA, PA. • CHICAGO, ILL.

and platform body with a permanent front, liftout sides, and stationary or removable rear corner posts. This model may also be fitted with seats and a canopy.

FAIRMONT CAR FOR BALLAST MAINTENANCE

FAIRMONT Railway Motors, Inc., Fairmont, Minn., is introducing the W77 Series A Ballast Maintenance car, an on-track, self-propelled unit equipped on each side with scarifiers, discs and blades for breaking up and churning cemented or fouled shoulder or intertrack ballast in order to maintain proper ballast drainage. It may also be equipped with ballast equalizing and shaping boxes. Tests of the machine were conducted last fall on the New York Central, with successful results.

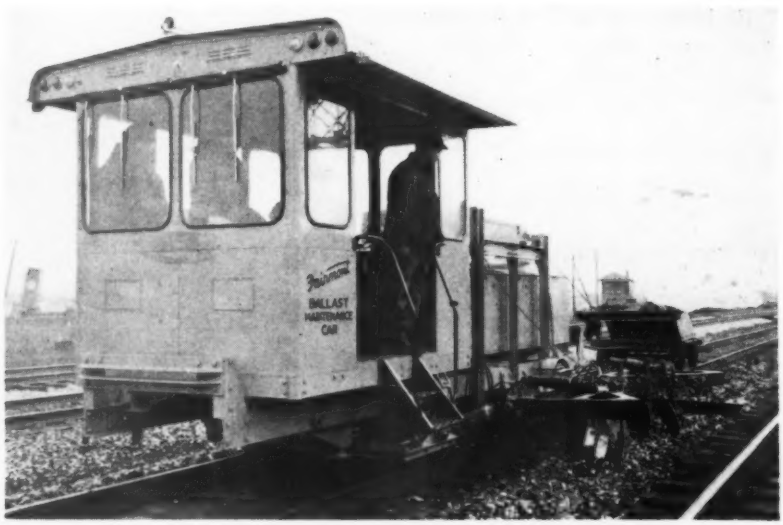
The unit is powered by a 6-cylinder, 112-hp. Waukesha engine with a fluid coupling to the transmission. The transmission is a four-speed, heavy-duty type with a 14-in. single-plate dry-disc clutch. The transfer case contains a two-speed gearing, and the final drive, therefore, has eight speeds in either direction. The deadheading speed of the unit is 35 m.p.h.

The tools are raised and lowered, moved in and out horizontally, and tilted with respect to the mounting to meet shoulder conditions—all by means of a hydraulic system with controls conveniently arranged in the cab, one set for each side of the machine. The hydraulic system is operated by a two-cylinder, air-cooled engine with direct drive to the pump.

The American Model 825 DE, 25-ton DiesElectric locomotive crane, with Diesel power to the deck and electric power to the trucks

NEW AMERICAN LOCOMOTIVE CRANE

A NEW 25-ton DiesElectric locomotive crane, designated Model 825 DE, has been introduced by the American Hoist & Derrick Co., St. Paul, Minn. In this unit it is said that thousands of pounds of wearing parts have been eliminated, resulting in sharply reduced maintenance costs. All deck operations of the crane are powered directly by the Diesel engine. Travel is accomplished by electric motors which drive the truck axles through reduction spur gears and pinions. Features of the crane include a full-vision cab, enclosed roller-bearing turntable, finger-tip air controls, a clean, efficient deck layout, and anti-friction bearings.



The Fairmont W77 Series A Ballast Maintenance car equipped with scarifiers, discs and blades, shown here in operation on the New York Central

WEED-CONTROL CHEMICAL

THE National Aluminate Corporation, Chicago, has announced a new weed-control chemical, known as Nalco H-170, which it is said, combines a contact, or top-killing, effect with an extensive root-killing action which substantially retards regrowth. The chemical has been under development for several years.

Nalco H-170 is a liquid, oil-base material that requires no mixing or dilution before application. Tests are reported to have shown that it will not contaminate water supplies and that it may be used safely in livestock grazing areas. Because of its low volatility, it presents no fire hazard, either in storage or during application.

For normal weed-killing operations the manufacturer recommends the use of one gallon of Nalco H-170 for each 1500 sq. ft. of area. Any type of sprayer may be used for application. However, the company announces that its own spray cars will be available, if desired, in time for the 1950 weed-control season.

Here's How You Can Get

LONG-LASTING RESULTS *plus* LONG-TERM ECONOMY

In Your Weed Control Program

Specify

GENERAL CHEMICAL *Formula 7B Weed Killer*

For a weed-free track *"immediately"*—and complete sterilization *ultimately*—investigate the advantages of General Chemical Formula 7B Weed Killer.

Here is a different and better weed killer that has won customer acceptance. It meets all requirements for improved control . . . gets results against broad-leaved weeds and grasses where ordinary methods fail. With General Chemical Formula 7B Weed Killer, clean track and ultimate sterilization can be a reality. Costly, wasteful, temporary measures can be eliminated for all time!

Expanded use and improved production techniques have now brought this superior weed killer within the range of every budget. Learn today how the benefits of General Chemical Formula 7B Weed Killer can be extended to your system, too . . . for *long-lasting results* plus *long-term economy.*

Some of the advantages of General Chemical Formula 7B Weed Killer:

KILLS Grasses

KILLS Broad-leaved Weeds

SUPPRESSES Seed Germination

RESISTS Washing Away by Rainfall

Helps PRESERVE Track Structure

For further information, write to

Weed Killer Department

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THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers

Changes in Railway Personnel

General

Stuart Shumate, supervisor of track on the Richmond, Fredericksburg & Potomac at Fredericksburg, Va., has been appointed superintendent of Potomac yard, Alexandria, Va., effective January 5.

Edwin M. Pelter, assistant trainmaster on the Southern, and an engineer by training and experience, has been promoted to trainmaster of the Mobile division, with headquarters as before at Selma, Ala.

S. R. Lamb, superintendent of the Lethbridge division of the Canadian Pacific, with headquarters at Lethbridge, Alta. and formerly bridge and building master on that road has retired from active service.

Robert J. Stone, assistant general manager, Eastern district, of the St. Louis-San Francisco, and formerly a track supervisor on the Southern, has been promoted to general manager, with headquarters at Springfield, Mo.

Engineering

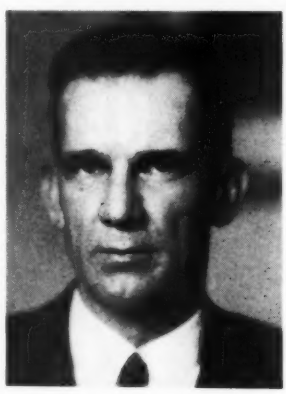
M. D. Clark, superintendent in charge of the transportation, roadway and mechanical departments of the Durham & Southern, has been appointed chief engineer, with headquarters as before at Charlotte, N. C.

F. O. Crosgrove has been appointed valuation engineer for the Western Pacific at San Francisco, Cal., succeeding **Richard I. Gloster,** who has retired after 28 years of service with the W. P. and its subsidiaries.

Roy Lumpkin, assistant maintenance engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been appointed manager of the tie and timber department, with the same headquarters.

W. S. Johns, Jr., assistant to the chief engineer—system, of the Pennsylvania, with headquarters at Philadelphia, Pa., has retired. **A. W. Duke,** assistant engineer maintenance of way of the Pennsylvania at Indianapolis, Ind., also retired recently, after 44 years of service with this road.

J. M. Fair, whose retirement as assistant chief engineer maintenance of way of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., was announced in the January issue was born at Carlisle, Pa., on September 21, 1886, and received his



J. M. Fair

engineering education at Lehigh University, from which he graduated in 1908. He entered the service of the Pennsylvania on April 1, 1910, as a rodman. After several assignments in this capacity and as transitman, he was appointed assistant supervisor of track at Baltimore, Md., on October 7, 1915, and was later transferred to the office of the engineer maintenance of way at Philadelphia. In 1920 he was advanced to supervisor of track on the staff of the chief engineer, and on July 15, 1924, was transferred to Chambersburg, Pa., returning to Philadelphia in 1926 as supervisor on the Philadelphia Terminal division. In January, 1927, Mr. Fair was appointed to the staff of the general manager at Philadelphia, and a year later was transferred to the Buffalo division as division engineer, remaining there until February, 1930, when he was transferred to the Long Island at Jamaica, N. Y. In 1934 he was advanced to engineer maintenance of way of the Western Pennsylvania division, at Pittsburgh, and in 1942 he was promoted to assistant chief engineer maintenance of way, holding this position until time of his retirement.

T. M. Mouring has been appointed assistant to the chief engineer of the Maryland & Pennsylvania, with headquarters at Baltimore, Md.

W. A. Foster, levelman on the Baltimore & Ohio, has been appointed clearance engineer, with headquarters at Baltimore, Md.

E. D. Billmeyer, assistant engineer on the Western Maryland at Baltimore, Md., has been appointed assistant division engineer, with headquarters at Cumberland, Md.

L. M. Poitevin, instrumentman on the Canadian National at Cochrane, Ont., has been promoted to assistant division engineer, with headquarters at Quebec, Que.

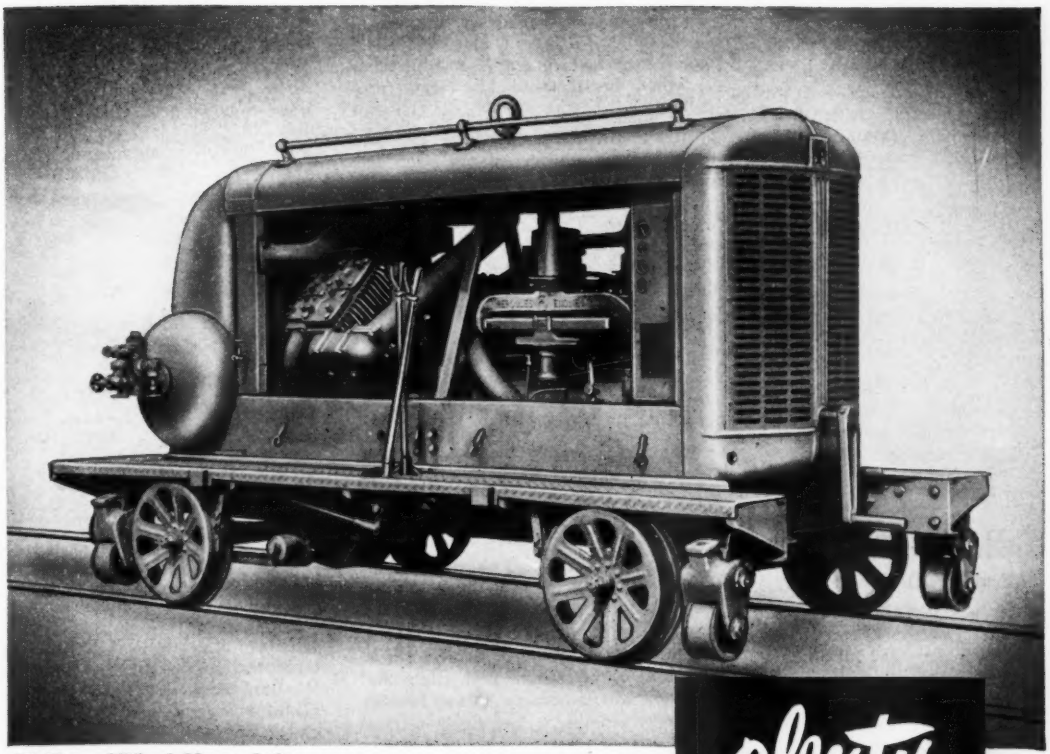
C. A. Beggs, formerly assistant division engineer of the Seaboard Air Line at Jacksonville, Fla., has been appointed assistant chief engineer of Santa Rosa Island Authority, Pensacola, Fla.

M. A. Michel, designing engineer on the Pittsburgh & Lake Erie, has been appointed research engineer, with headquarters at Pittsburgh, Pa. **C. F. Gall** has been appointed research engineer to succeed Mr. Michel.

W. O. Boessneck, assistant chief draftsman on the Erie at Cleveland, Ohio, has been advanced to chief draftsman, succeeding **Charles M. Burgess,** who retired October 31, 1949, after 43 years' service.

R. H. Beeder, whose promotion to assistant to chief engineer, system, of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, was reported in the December issue, was born on August 26, 1905, at Mobile, Ala., and received his higher education at the University of Michigan. He entered railroad service with the Santa Fe on July 1, 1920, as a carman helper and signalman helper, with headquarters at La Junta, Colo. On September 1, 1925, he became a draftsman and later served in various engineering positions. On February 1, 1940, he was promoted to general foreman, bridges and buildings and water service, on the Western lines, and on September 20, 1943, he was appointed division engineer, with headquarters at Emporia, Kan. Mr. Beeder was promoted to district engineer, on May 6, 1948, and served in this capacity until his recent promotion to assistant to chief engineer, system.

(Please turn to page 160)



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- CP Flanged-Wheel Mounted Compressors are available in 105, 160, 210, 315 and 500 c.f.m. actual capacity, gasoline or Diesel driven. Also non-self-propelled models.

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Railway Personnel (Cont'd)

Paul H. Croft, whose promotion to assistant engineer maintenance of way of the Illinois Central, with headquarters at Memphis, Tenn., was announced in the December issue, was born on December 22, 1892, at Fulton, Ky. Obtaining degrees of B. S. in civil engineering and of civil engineer from the University of Kentucky, Mr. Croft entered railroad service in April, 1914, with the Illinois Central, serving as a chainman at Fulton. He was appointed rodman on August 16, 1915, with headquarters at Carbondale, Ill., and was transferred back to Fulton two months later. On April 15, 1916, he was appointed instrumentman at Fulton, and on November 16, 1918, he was advanced to assistant engineer, with headquarters at Clinton, Ill. Mr. Croft was appointed instrumentman on August 1, 1919, working on construction, and on December 1, 1921, he became assistant engineer at Chicago. He was promoted to track supervisor on February 6, 1922, at Dyersburg, Tenn., and was subsequently transferred to Christopher, Ill., Centralia, Ill., and East St. Louis, Ill. In September, 1941, he was promoted to division engineer, with headquarters at Clinton, and later was transferred to Water Valley, Miss. Mr. Croft was transferred to Chicago in March 1943, and served at that point until his recent promotion to assistant engineer maintenance of way.

Paul H. Croft

Clarence M. Kern, whose promotion to assistant division engineer of the Huntington division of the Chesapeake & Ohio at Huntington, W. Va., was noted in the December issue, was born at Clifton Forge, Va., on May 16, 1906. He entered the service of the C. & O. on March 13, 1929, as a junior rodman at Hinton, W. Va. He was advanced to inspector at Clifton Forge in 1931 and to instrumentman at Huntington on March 10, 1939. From December 20, 1943, to July 15, 1946, he served as resident engineer at Pikesville, Ky., and as assistant cost engineer at Clifton Forge, and on the latter date became assistant supervisor of track at Clifton Forge. Mr. Kern was promoted to supervisor of track at Gordonville, Va., on October 1, 1948, where he remained until last September 1, when he received his recent promotion.

George H. Echols, division engineer on the Southern at Atlanta, Ga., has been promoted to chief engineer, maintenance of way and structures of the road's Central Lines at Knoxville, Tenn., succeeding **R. F. Logan,** whose death on December 7 is reported elsewhere in these columns. **Eugene T. Fitzgerald,** assistant division engineer on the Southern at Atlanta, Ga., has been promoted to division engineer, with the same headquarters. **R. F. Bishop,** structural engineer at Washington, D. C., has been advanced to assistant engineer.

John W. Kidd, bridge and building supervisor on the Southern at Atlanta, Ga., has been promoted to assistant division engineer of the Knoxville division, with headquarters at Knoxville, Tenn.

Raymond A. Jackson, assistant supervisor on the Maine Central at Lewiston, Me., has been promoted to division engineer, with headquarters at Portland, Me., succeeding **John P. Scully,** whose promotion to industrial, real estate and tax agent was announced in the January issue.

J. Cameron King, recently promoted to bridge engineer of the Atlantic region of the Canadian National at Moncton, N. B., as noted in the December issue, was born at Vancouver, B. C., on December 9, 1912, and attended the University of British Columbia, from which he received the degree of Bachelor of Applied Science in 1939. Following his graduation, he was engaged in various capacities on the preliminary surveys for the Alaska highway and on the construction of military air fields in Alberta and Saskatchewan. He entered the service of the Canadian National on April 22, 1944, as a structural designer in the office of the engineer of bridges at Toronto, and on December 19, 1948, he was advanced to assistant bridge engineer of the Central region at that point. He held the latter position until the time of his recent promotion.

J. Cameron King

Loren Shedd, whose promotion to bridge engineer of the Grand Trunk Western, with headquarters at Detroit, Mich., was announced in the January issue, was born at Tekonsha, Mich., on July 20, 1899. He received a B.S. degree in civil engineering from the Michigan State College in 1921, and entered the service of the Grand Trunk Western as a draftsman in 1927. Mr. Shedd was advanced to designing engineer on January 1, 1947, and served in the capacity until his recent promotion to bridge engineer.

Loren Shedd

John McClure Salmon, Jr., assistant bridge inspector of the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed chief engineer of the Clinchfield, with headquarters at Erwin, Tenn., succeeding **V. B. Elliott,** who has retired after 44 years of service. **Phillip R. Eastes,** assistant bridge engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed assistant bridge inspector at that point, succeeding Mr. Salmon. Appointed to succeed Mr. Eastes is **Lawrence E. Best,** assistant engineer at Louisville, who has been replaced in turn by **R. W. Pember,** assistant engineer, Evansville division, at Evansville, Ind. **John H. Upham,** draftsman at Louisville, succeeds Mr. Pember.

William B. Throckmorton, system locating engineer of the Chicago, Rock Island & Pacific, has been promoted to chief engineer, with headquarters at Chicago, succeeding **Frank W. Thompson,** retired. Appointed assistant chief engineer at Chicago is **Walter E. Heimerdinger,** engineer of bridges at that point, who has been succeeded by **John F. Marsh,** assistant bridge engineer. **F. W. Madison,** division engineer, with headquarters at Kansas City, Mo., replaces Mr. Marsh, and **C. O. Bryant** has been appointed division engineer succeeding Mr. Madison. **James T. Fitzgerald,** construction engineer, has been named engineer maintenance of way at Chicago, succeeding **Belsur Bristow,** appointed principal assistant engineer at that point. Mr. Bristow succeeds **Lorne J. Hughes,** who has retired.

(Please turn to page 162)

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"YES AND I HAVE TO ADMIT THAT WE MISSED YOUR PRODUCT. WE WERE SOLD ON A NEW TYPE OF PRODUCT. LETTERS WERE SHOWN TO US STATING HOW EFFECTIVE THE PRODUCT WAS. THE PRICE WAS LOWER THAN YOURS AND SO YOU LOST OUT. WORSE LUCK, WE REGARD THE WORK OF 1949 AS A COMPLETE FAILURE."

"YOU USED OUR PRODUCTS AND SERVICE FOR MANY YEARS. PERHAPS YOUR RECENT EXPERIENCE INDICATES THAT OUR YEARS OF EXPERIENCE AND OUR SERVICE HAS A VALUE."

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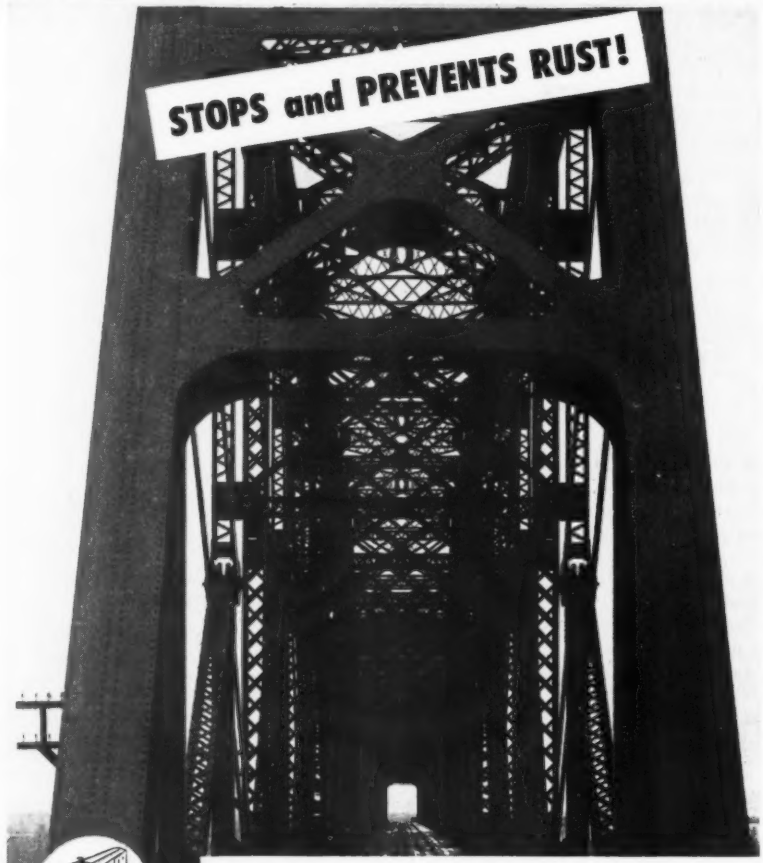

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Railway Personnel (Cont'd)

H. Gray Carter, engineer maintenance of way of the Central of Georgia, has been promoted to chief engineer with headquarters as before at Savannah, Ga., succeeding **Hiram F. Sharpley,** who retired on January 1, after more than 50 years of railway service. **George A. Belden,** engineer bridges and buildings, has been promoted to the newly-created position of assistant chief engineer. The positions of engineer maintenance of way and engineer bridges and buildings have been abolished.

Track

Charles W. Bowers, assistant engineer on the Central of Georgia, has been promoted to road supervisor on the Savannah division, with headquarters at Millen, Ga. He succeeds **W. V. Waters,** who retired on January 1 after 48 years' service.

H. O. McDaniels, rodman on the Pittsburgh & Lake Erie, has been promoted to assistant supervisor at East Youngstown, Ohio, effective January 1, filling the vacancy left by the promotion of **J. M. Dodds,** to supervisor, which was announced in the November issue.

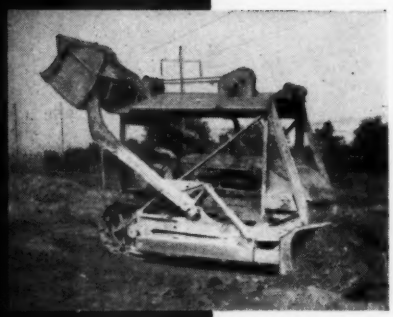
W. L. Wages, section foreman on the Illinois Central, with headquarters at Memphis, Tenn., has been promoted to supervisor of track at Lambert, Miss., succeeding **J. H. Dame, Jr.,** who has been transferred to Greenwood, Miss. Mr. Dame succeeds **J. W. Fowler,** whose death is reported elsewhere in these columns.

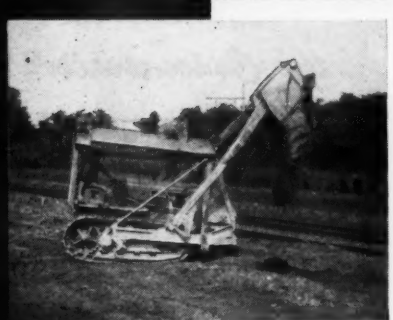
W. H. Shoemaker, supervisor of track on the Pennsylvania, with headquarters at Valparaiso, Ind., has joined the Richmond, Fredericksburg & Potomac as supervisor of track at Potomac Yard, Alexandria, Va., succeeding **D. C. Hastings,** who has been appointed main line supervisor of track at Fredericksburg, Va. Mr. Hastings succeeds **Stuart Shumate,** whose appointment as superintendent at Potomac Yard is noted elsewhere in these columns.

R. E. Kleist, assistant supervisor of track on the Maryland division of the Pennsylvania, with headquarters at Wilmington, Del., has been promoted to supervisor of track of the Lake division, at Orrville, Ohio, succeeding **R. D. Baldwin,** who has been transferred to the Conemaugh division at Kittanning, Pa. Mr. Baldwin succeeds **R. M. Buchanan,** who has been transferred to Dayton, Ohio, replacing **H. M. Curtiss,** who has resigned. **L. E. Ward,** junior engineer on the Panhandle division at Coshocton, Ohio, has been appointed assistant supervisor of track on the Chicago division at Colhour, Ind., succeeding **C. G. Weinel,** who has been transferred to Wilmington replacing Mr. Kleist. These changes became effective January 16.

(Please turn to page 164)

One for all!





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On this job, for example, one man using the Oliver "Cletrac" and Sargent Overhead leveled a strip 200 feet wide and one-quarter mile long at far lower cost than was possible with other methods.

The strip was leveled and rough graded with the bulldozer. Then, in 5 minutes, the bulldozer blade was removed and the Overhead shovel filled in the low spots along the track to assure good drainage. When the bulldozer is used, the Overhead shovel acts as a counterbalance for most effective dozing.

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For lowest cost maintenance, investigate the Oliver "Cletrac" and Sargent Overhead. See your local Oliver "Cletrac" Distributor.

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BORASCU is the ideal chemical because it is non-selective and destroys most all vegetation. When correctly used, BORASCU will prevent the growth of vegetation for 12 to 24 months, or longer. BORASCU is applied dry, just as it comes from the convenient, easily disposable, 100-lb. bags. Your section hands can apply BORASCU, without tieing up tracks and equipment, by following simple directions. A common 12-quart pail and BORASCU are all that is required to eliminate weeds and grasses.

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Railway Personnel (Cont'd)

Allan Hazen, inspector on the Maine Central, has been appointed assistant track supervisor at Lewiston, Me., succeeding **Raymond A. Jackson,** whose promotion to division engineer is noted elsewhere in these columns.

C. M. Thompson, transitman on the Canadian Pacific at Moose Jaw, Sask., has been promoted to roadmaster at Wilkie, Sask., succeeding **D. H. Dunphy,** whose promotion to division engineer was noted in the January issue.

G. H. Sims, roadmaster on the Seaboard Air Line at Charleston, S. C., has been appointed acting general roadmaster at that point, replacing **J. D. Coe,** who is ill. Mr. Sims will have charge of all lines north of Savannah. **C. C. Crenshaw,** assistant roadmaster on the Virginia division at Hamlet, N. C., has been appointed acting roadmaster at Charleston to succeed Mr. Sims.

J. P. McIntyre, assistant supervisor of track on the Philadelphia division of the Pennsylvania, with headquarters at Lancaster, Pa., has been promoted to supervisor of track on the Indianapolis division at Columbus, Ind., succeeding **E. J. Sierleja,** who has been transferred to the Williamsport division at Williamsport, Pa. Mr. Sierleja succeeds **J. W. Harper** who has been transferred to the Fort Wayne division at Valparaiso, Ind., to replace **W. H. Shoemaker,** whose appointment as supervisor of track on the Richmond, Fredericksburg & Potomac is noted elsewhere in these columns. **A. I. Syversten,** junior engineer at New York, has been appointed assistant supervisor of track at Jamesburg, N. J., succeeding **A. Cywin,** who has been transferred to Lancaster replacing Mr. McIntyre.

Effective January 1, the Lehigh Valley abolished its Wyoming division and merged it with the New York and the Buffalo divisions. The following changes in personnel assignments have resulted from this action. **J. E. Crowley,** formerly division engineer of the Wyoming division, has been appointed track supervisor, with headquarters as before at Wilkes-Barre, Pa., replacing **J. F. Curry,** who has been transferred to Auburn, N. Y., to succeed **C. J. Marr,** who has been assigned to other duties. The position of track supervisor at Towanda, Pa., has been abolished and **W. C. Burke,** who formerly held that position, has been transferred to Sayre, Pa., to replace **J. A. Senall.** Mr. Senall has been transferred to Buffalo, N. Y., where he succeeds **A. J. Murphy,** who has been appointed assistant supervisor at Manchester, N. Y. **O. W. Kays,** assistant supervisor at Easton, Pa., has been transferred to Sayre.

Bridge and Building

In connection with the consolidation of territories on the Pennsylvania mentioned in the December issue, **F. D.**

Day, master carpenter of the former Monongahela division, has been appointed assistant master carpenter of the Pittsburgh division at Pittsburgh, Pa.; **J. Brandimarte,** master carpenter of the former Erie and Ashtabula division, has been made assistant master carpenter of the Lake division at New Castle, Pa.; and **C. A. J. Richards,** master carpenter of the former Grand Rapids division, has been appointed assistant master carpenter of the Fort Wayne division at Grand Rapids, Mich.

In connection with the consolidation of territories on the Lehigh Valley, described more completely elsewhere in these columns under Track, **W. P. Clark,** supervisor of bridges and buildings of the former Wyoming division, has been appointed assistant supervisor of bridges and buildings, with headquarters as before at Wilkes-Barre, Pa.

Frank M. Kaylor, assistant bridge and building supervisor on the Southern at Atlanta, Ga., has been promoted to bridge and building supervisor at Valdosta, Ga., succeeding **Rush A. Kelso,** who has been transferred to the Atlanta division, at Atlanta, to replace **John W. Kidd,** whose promotion to assistant division engineer is noted elsewhere in these columns.

J. A. Campbell, assistant master carpenter of the Philadelphia division of Pennsylvania at Harrisburg, Pa., has been promoted to master carpenter of the St. Louis division, with headquarters at Terre Haute, Ind., succeeding **R. A. Westergren,** whose transfer to the Maryland division at Baltimore, Md., was noted in the January issue. **J. J. Betelak,** junior engineer on the Maryland division at Baltimore, has been promoted to assistant master carpenter of the Philadelphia division, succeeding Mr. Campbell.

Special

D. A. Morris has been appointed supervisor of work equipment on the Grand Trunk Western, with headquarters at Durand, Mich.

H. G. Pike, research engineer on the Pittsburgh & Lake Erie, at Pittsburgh, Pa., has been appointed superintendent of equipment, with headquarters at McKees Rocks, Pa.

Obituary

Martin W. Thomas, retired tie and timber inspector on the Southern, died at Greensboro, N. C., on November 22, 1949.

J. W. Fowler, supervisor of track on the Illinois Central, with headquarters at Greenwood, Miss., died recently.

Robert F. Logan, chief engineer, maintenance of way and structures, of the Southern at Knoxville, Tenn., died suddenly on December 7, 1949.

(Please turn to page 166)

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Of All That Is Best In Gasoline Engine Performance

. . . backed by experience gained in more than 30 years of continuous production and the building of more than 4 million air-cooled engines.

There are more Briggs & Stratton engines in service than all other makes of gasoline engines in their field combined —proof that they are "preferred power" the world over. Insist on Briggs & Stratton 4-cycle, single-cylinder, air-cooled engines to power your equipment.

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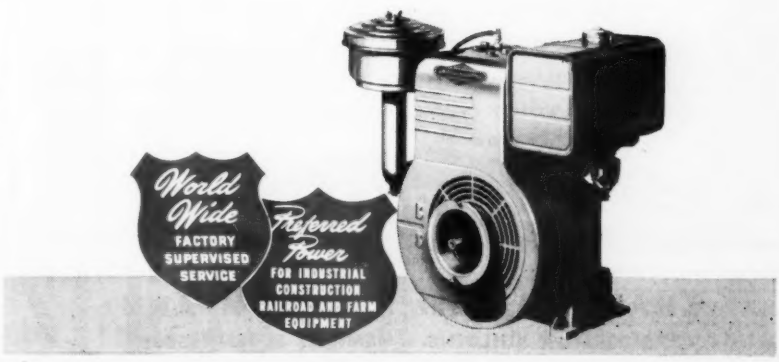

CHEMICAL CONTROL of weeds, grass and other growth

The rapid advances recently made in developing chemicals to kill or suppress the growth of grasses and weeds now make it possible to maintain a clean right-of-way with considerably less labor and at far less cost than older methods.

At the same time, the great variety of plant life, climatic conditions and soil types encountered make it impossible to offer any one chemical "prescription" for all such purposes.

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Association News

Metropolitan Maintenance of Way Club

The next meeting of the club will be held on February 23, in the Skyline Room of the Hotel Shelburne, Lexington avenue and Thirty-Seventh street, New York. The program will feature a paper by H. C. Drake, research consultant of Sperry Rail Service, Danbury, Conn., describing the new Sperry ultrasonic rail inspection detector cars which are capable of detecting rail defects within the limits of the joint bar. The program will be preceded by a dinner, beginning at 6:30 p. m.

Maintenance of Way Club of Chicago

A record-breaking attendance of 222 members and guests crowded into the dinner meeting of the club on January 23, to hear C. B. Bronson, maintenance

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 14-16, 1950, Chicago. W. S. Lacher, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual meeting April 25-27, 1950, Rice Hotel, Houston, Tex. H. L. Dawson, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—E. C. Gunther, Secretary, 122 S. Michigan Avenue, Chicago 3.

Maintenance of Way Club of Chicago—Next meeting, February 27, 1950. E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Walter L. Turner, Jr., Secretary, 30 Church street, New York.

National Railway Appliance Association—R. B. Fisher, Secretary; Lewis Thomas, assistant, Secretary 59 E. Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, August 28-30, 1950, Brown Hotel, Louisville, Ky., Roy M. Edmonds, Secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago, 5.

of way assistant to vice-president, New York Central System, discuss the subject of "How Long Should A Rail Be?" The text of Mr. Bronson's address will appear in an early issue of *Railway Engineering and Maintenance.*

The next meeting of the club, to be held at the usual place—Eitel's Restaurant in the Field Building—will be on February 27, and will be addressed by J. P. Newell, general manager, Western region, Pennsylvania, who will speak on the subject "Let's Get More Out of Work Equipment." The business session will be preceded by the usual reception and dinner beginning at 6:00 p.m.

Record Exhibit Assured During September Convention

The interest already manifested by railway supply companies in the exhibit to be held at Chicago in September by the Track Supply Association and the Bridge and Building Supply Men's Association is such as to indicate that this exhibit will be the largest ever held by these associations. This exhibit will be held during the concurrent but separate conventions of the Roadmasters' and Maintenance of Way Association and the American Railway Bridge and Building Association, which will take place September 18-20. At the time of going to press applications had already been received from 66 firms which will occupy a total of 165 booths. This space is in excess of that used in any past exhibit of these associations. An indication of the widespread interest in the exhibit is the fact that applications have been received from six firms that have never exhibited before.

Supply companies interested in participating in the exhibit should address their requests for information to Lewis Thomas, Director of Exhibits, 59 E. Van Buren street, Chicago.

American Railway Engineering Association

It is now possible to announce a number of the more important events to take place at the annual convention, to be held March 14-16 at the Palmer House, Chicago. One of these will be an inspection by those attending the convention of the new $600,000 research laboratory constructed by the Association of American Railroads, on the campus of the Illinois Institute of Technology. The laboratory will be open for any visitors who may care to inspect it on Monday, March 13, but on Tuesday afternoon it is planned to close the meeting at the Palmer House at 4:00 o'clock to permit the group as a whole to participate in a formal inspection of the laboratory. The group will be taken to the laboratory in a special train provided by the New York Central, which will leave the LaSalle street station at a time to be announced later. The train will return to the "Loop" at about 6 p. m.

(Continued on page 168)

50 YEARS OF DEPENDABLE SERVICE 1900-1950

SCHRAMM MODEL 60 CRAWLER mobile air compressor

Get it for one job . . . Use it for many.

Naturally your Schramm Model 60 Crawler will be busiest at its main job, tie tamping, because it is an ideal four-tamper compressor for either spot or (with multiple units) out-of-face tamping. But that won't limit your Crawler's usefulness. You'll find that it's no *prima donna* with a single role. The Crawler's mobility fits it to many railroad jobs. Some are listed at the right. As you look them over reflect that busy machines are better earners and that your Crawler will be seldom idle because it is versatile. Then write "The Compressor People" for all the interesting facts. Ask for Bulletin FC 49.

Track and Right of Way Maintenance
- Tie tamping (with 4 tampers)
- Tie boring
- Rail bonding drilling
- Rail grinding
- Spike driving
- Pressure grouting
- Spraying fire-retardant coating on bridge decks
- Rock drilling
- Weed mowing and burning
- Weed spraying

Bridges and Buildings
- Chain saws
- Jack hammers
- Backfill tampers
- Concrete vibrators
- Paint sprayers
- Sheet pile drivers
- Rust chippers
- Concrete breakers
- Injecting joint iron under bridge seats
- Air-driven pumps

Miscellaneous uses (non-air)
- Towing
- Snow clearing around stations and yards
- Operating belt-driven machines such as saws, sump pumps, etc.
- Back-filling excavations

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

Association News (Cont'd)

Another important feature on the program of the convention will be an address by W. G. Vollmer, president, Texas & Pacific, who will be the principal speaker at the annual luncheon on Wednesday.

Only one committee meeting has been scheduled for February. The Committee on Wood Bridges and Trestles will meet on February 9 at the Roosevelt hotel at New Orleans, La. On the following day the committee will visit a large sawmill at Alexandria, La., to study the handling, inspection and grading of lumber.

The February Bulletin (No. 486), will be mailed to members on February 15. This bulletin will contain the reports of four committees, namely, Roadway and Ballast, Track, Rail, and Cooperative Relations with Universities.

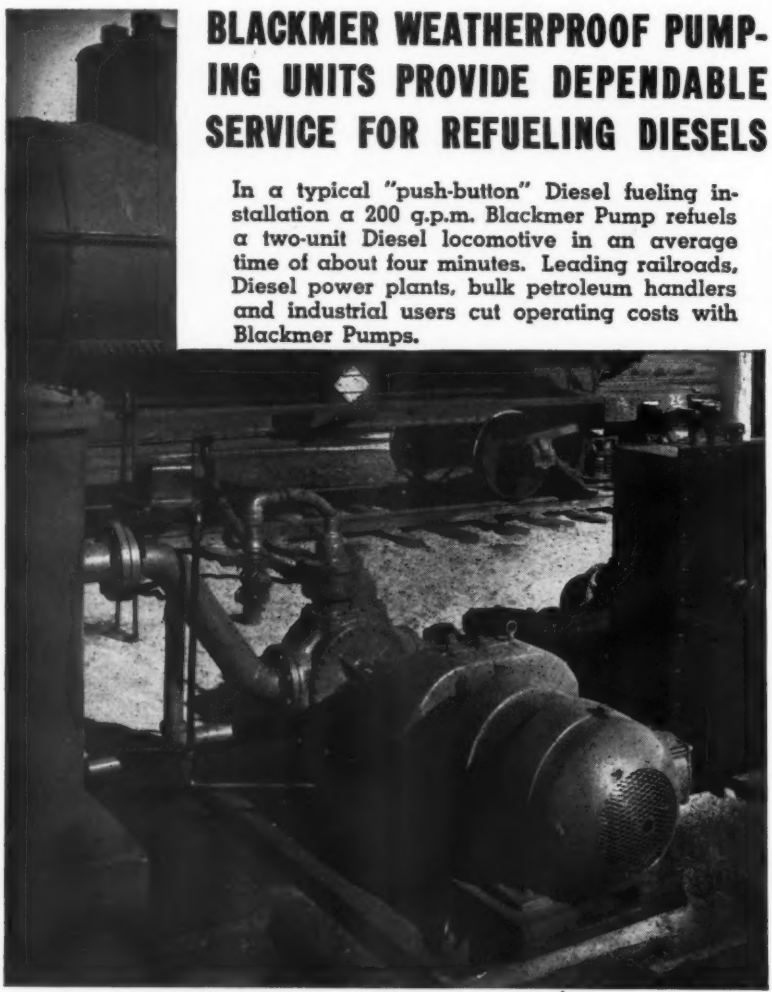
Supply Groups Announce Agreement on Exhibitions

The National Railway Appliances Association, the Track Supply Association, and the Bridge & Building Supply Men's Association have entered into a formal agreement, to remain in effect until September 30, 1956, in which it is stipulated that, during the period of the agreement, exhibitions of manufacturers' products sponsored by these associations during conventions of railway engineering and maintenance officers will be spaced 18 months apart instead of beng held twice annually as has been the general practice in recent years.

It has been the policy of the N.R.A.A. to sponsor an exhibition in March of each year during the annual convention of the American Railway Engineering Association. Smilarly, the T.S.A. and the B.&B.S.M.A. have sponsored an exhibition each year in September during the simultaneous conventions of the Roadmasters' & Maintenance of Way Association and the American Railway Bridge & Building Association. Since many railway supply companies are members of all three associations the practice of holding exhibits in both March and September each year has meant that these companies have been subjected to the expense of two exhibits a year. The new agreement is an expression of the desire of the members of the three manufacturers' associations "to restrict the number of their exhibitions and to coordinate the exhibiting acivities of their respective associations toward the end that more effectiveness and greater economy can be achieved in holding their respective exhibitions. . . ."

The agreement specifies that the associations "will combine their efforts and jointly cooperate in giving exhibitions only every 18 months, "commencing in September, 1950, and followed in March, 1952, September, 1953, March, 1955, and September 1956. . . ." The exhibitions in September, 1950, 1953, and 1956 are to be under the auspices of the T.S.A. and the B.&B.S.M.A., but will be "joined in by the National Railway Appliances Association." The exhibitions in March, 1952, and 1955 are to be under the auspices of the N.R.A.A., but are to be "joined in by the Track Supply Association and the Bridge & Building Supply Men's Association." In order to participate, a supply company or individual must be a member of the association sponsoring the supply exhibit in any particular year. A stipulation of the agreement is that neither the signatory parties nor any of their members will hold exhibitions or displays during the conventions in 1951 and 1954. It is further specified that the location of the exhibitions shall, if possible, be the Coliseum at Chicago.

Each of the three associations "will retain its own identity and exclusively be responsible for such social functions which have been a matter of practice throughout their histories in connection with the convention activities of the railway associations their activities served." Specifying that the agreement will remain in effect until September 30, 1956, the agreement states that at that time the "three contracting associations agree to have their respective boards of directors re-examine the results of these coordinated endeavors with the view of establishing a permanent practice with respect to the railroad supply industry's exhibition responsibilities."



BLACKMER WEATHERPROOF PUMPING UNITS PROVIDE DEPENDABLE SERVICE FOR REFUELING DIESELS

In a typical "push-button" Diesel fueling installation a 200 g.p.m. Blackmer Pump refuels a two-unit Diesel locomotive in an average time of about four minutes. Leading railroads, Diesel power plants, bulk petroleum handlers and industrial users cut operating costs with Blackmer Pumps.

Typical Outdoor Blackmer Railside Installation

Blackmer Pumps are "self-adjusting" for wear to provide a sustained high efficiency. Should working parts eventually wear out, they may be inexpensively and quickly replaced. Blackmer Pumps are the choice of cost-minded Diesel men because of: 1. Low power consumption. 2. Minimum maintenance. 3. Long service life whether installed indoors or in an exposed outdoor installation.

Write for Bulletin 307, "FACTS ABOUT ROTARY PUMPS."

BLACKMER PUMP COMPANY – GRAND RAPIDS, MICHIGAN

The agreement was signed by the presidents of the three associations—H. M. McFarlane of the N.R.A.A., Kenneth Cavins of the T.S.A., and G. R. Betts of the B.&B.S.M.A.—and was attested by the secretaries of the associations—R. B. Fisher, Lewis Thomas, and E. C. Gunther, respectively.

Supply Trade News

General

A $10,000,000 modernization and building program is being carried out by **Fairbanks, Morse & Co.,** at its principal plants. Among the first projects is to be the installation of a new $2,500,000 power plant, housing three 80,000-lb. steam boilers, at the Beloit (Wis.) works. Work is nearing completion on a new branch office at Chicago, and personnel is expected to occupy the building early in February.

In the sales expansion program of the **Graver Water Conditioning Company,** since its establishment as a separate division of the **Graver Tank & Mfg. Co.,** the concern has appointed three of the parent company's engineering representatives as its sales agents: **J. R. Fortune & Son,** Detroit, Mich.; the **Stapp Engineering Company,** Denver, Colo., and the **Process Equipment Company,** Tulsa, Okla.

Personal

V. E. McCoy has resigned his position as chief engineer of the **National Aluminate Corporation, Chicago,** to engage in other business activities.

G. W. Stahl has been appointed division sales manager of the **Blackmer Pump Company** at Chicago. Mr. Stahl formerly represented the A. O. Smith Corporation and the Yale & Towne Manufacturing Co.

J. J. Davis, Jr., manager of sales, railroad division, **Inland Steel Company,** Chicago, has assumed also the responsibility for pig iron and chemical sales. **A. C. Engh** has been appointed manager of the pig iron and chemical section of the consolidated sales units.

C. B. Armstrong, formerly manager, railroad sales, Eastern region, of the **Air Reduction Sales Company,** has been appointed assistant to the vice-president, railroad sales and **D. E. Dallman,** formerly division manager at New York, has been appointed to Mr. Armstrong's previous position. Both will maintain headquarters at 60 East 42nd street, New York.

Dwight L. Merrell, formerly manager of sales for construction industries of the **Carnegie-Illinois Steel Corporation,** a **United States Steel Corporation** subsidiary, has been appointed sales manager of this subsidiary for the Philadelphia, Pa., district. Other managerial promotions are as follows: **Samuel McClements, Jr.,** as sales manager for the railroad materials and commercial forgings division, **F. Royal Gammon** as sales manager for the Eastern area, **Wesley C. Bobbitt** as sales manager in the New York district, and **Donald K. Wright** as assistant sales manager in Philadelphia.

John H. Trent, whose retirement as vice-president in charge of transportation sales of the **Johns-Manville Sales Corporation** was reported in the January issue entered railroad service in 1901 as an apprentice on the Illinois Central. He served in the mechanical and stores departments and later worked as storekeeper at Water Valley, Miss., Memphis, Tenn., and Paducah, Ky., until 1907, when he joined Johns-Manville. Since 1907 he has worked in various capacities, including general sales manager, western region, general sales manager transportation and government department, and vice-president in charge of transportation sales.

The **Dearborn Chemical Company,** Chicago, has announced the following personnel changes: **C. C. Rausch,** assistant vice-president, who was formerly associated with the railroad field pri-

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Railroad Weed Control Service Since 1912

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Supply Trade News (Cont'd)

marily, has been appointed manager of the industrial department's "No-ox-id" rust preventive sales in all company markets; **J. G. Surcheck,** technical advisor and engineer, becomes assistant manager of "No-ox-id" sales in the production and maintenance fields; **E. M. Welch,** formerly sales representative in Pittsburgh, Pa., has joined the Chicago office as manager of sales of water treatment and equipment; **C. S. Silsbee** becomes assistant manager in charge of all national accounts and service for both water treatment and "No-ox-id"; **A. H. Reynolds,** formerly directing chemist of the company's laboratories, has been appointed director, product development, and will be assisted by **L. O. Gunderson** as assistant director; and **Dr. Wayne L. Denman** has been promoted to directing chemist, with headquarters at the main factory at Chicago.

H. C. Atwater, formerly sales representative in the New York office of the **Industrial Brownhoist Corporation,** Bay City, Mich., has been appointed district sales manager in charge of the New York territory.

J. S. Crane, vice-president and secretary of the **Simmons-Boardman Publishing Corporation,** has been assigned to manage advertising sales for the company's transportation publications, including *Railway Engineering and Maintenance,* Railway Age, Railway Mechanical and Electrical Engineer and Railway Signaling and Communications, succeeding **S. Wayne Hickey,** who has been granted a leave of absence. Mr. Crane, heretofore in charge of advertising sales in the Eastern district for another Simmons-Boardman publication, American Builder, has also been given supervision of research and promotion on all the company's publications. **J. R. Thompson,** vice-president in charge of advertising sales transportation papers, in the Western district, has been appointed assistant manager, advertising sales, transportation papers, reporting to Mr. Crane. He will, for the time being, retain his present assignment in the Western district in addition to his new duties. Messrs. Crane and Thompson will continue to maintain headquarters as before at New York and Chicago, respectively.

Col. A. L. Bartlett, formerly engineer maintenance of way of the New York, New Haven & Hartford, has joined the sales department of the **F. Burkart Manufacturing Company,** Railroad Tie Pad Division. Colonel Bartlett will represent the company in the eastern territory.

James F. McCartney has been appointed general sales manager of **The Duff-Norton Manufacturing Company,** with headquarters at Pittsburgh, Pa. Mr. McCartney will be in charge of all railroad, industrial and mining sales of Duff-Norton jacks.

Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 103)

Fire Extinguishing Equipment—The Ansul Chemical Company has published a 20-page catalog describing the complete Ansul line of dry-chemical fire equipment. Included are the Model B extinguishers, piped systems, and large stationary units. The catalog also includes charts showing characteristics of approved hand fire equipment and comparative effectiveness graphs.

Chemical Ice and Snow Remover The Chem Industrial Company has issued a technical bulletin on its chemical ice and snow remover, known as Melt. This product is a powder (small pellets) designed for use in loading docks, steps, sidewalks, streets, parking lots, etc., and for thawing frozen gutters, sewers, pipes and switches.

Structural Steel Fabrication and Erection—The plants and products of the American Bridge Company are featured in a 16-page booklet recently published by this company. It presents a brief history of each of the company's six structural steel fabricating plants, and lists the principal buildings and products of each plant. The booklet is illustrated with striking photographs of some of the important bridges, buildings and other structures which have been fabricated and erected by the American Bridge Company.

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BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only **BURRO** *cranes have:*

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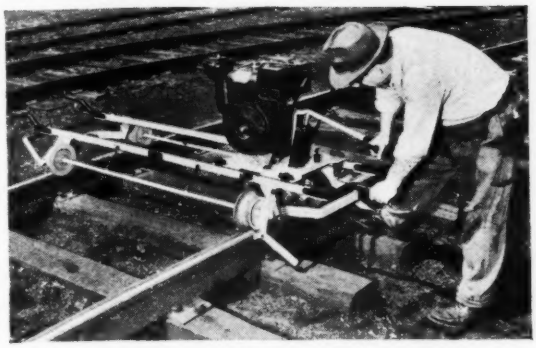

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TRAXCAVATOR®

The Original Tractor Excavator

LOWER COST OPERATION

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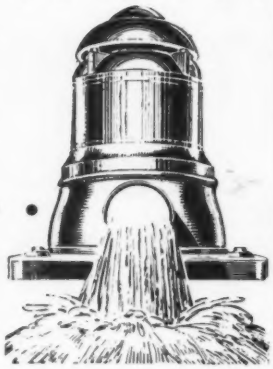

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FROM ½ GPM
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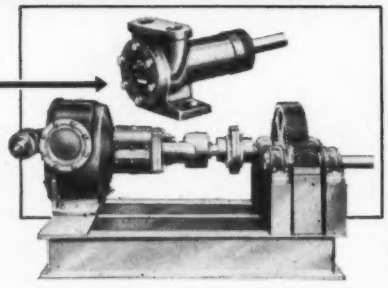

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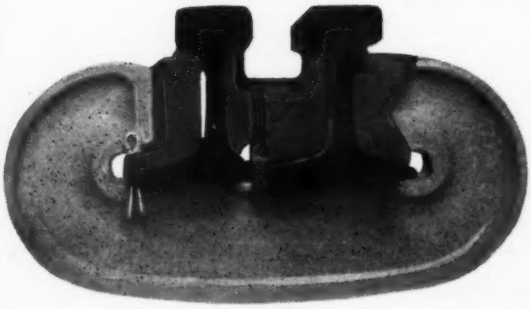

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One size of yoke is suitable for a range of rail sections, which simplifies and reduces your storeroom stocks.

Order now for early delivery.

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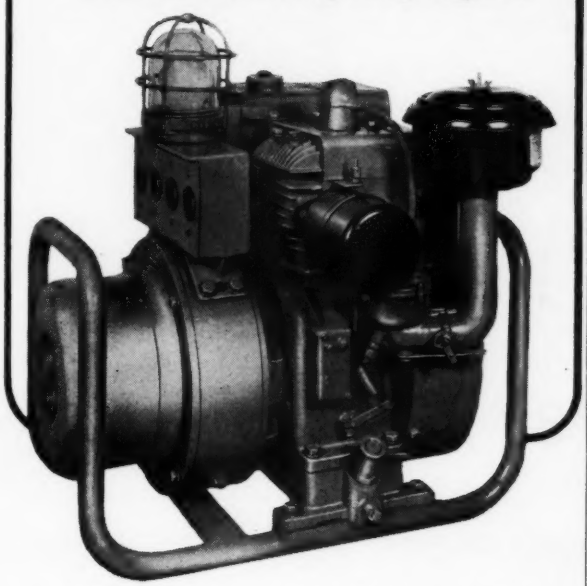
Chicago 5 **New York 6** **St. Louis 1**

Cost-cutting power for on-the-job tools and emergency lights



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BEALL HI-DUTY SPRING WASHERS, being made especially for railroad service are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

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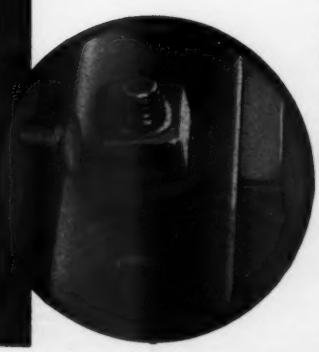
SPECIALIST MANUFACTURERS OF SPRING WASHERS



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that are essential with the 40-hr. week?

Unquestionably, the 40-hr. week will result in improved operating methods and the adoption of more labor-saving equipment to handle railroad maintenance in a shorter work week. Never before has there been a greater need for the latest edition of the

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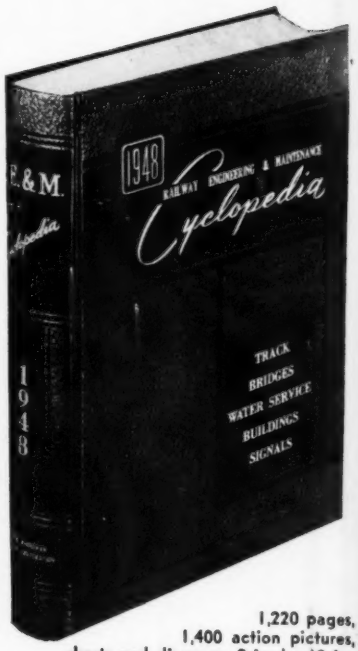

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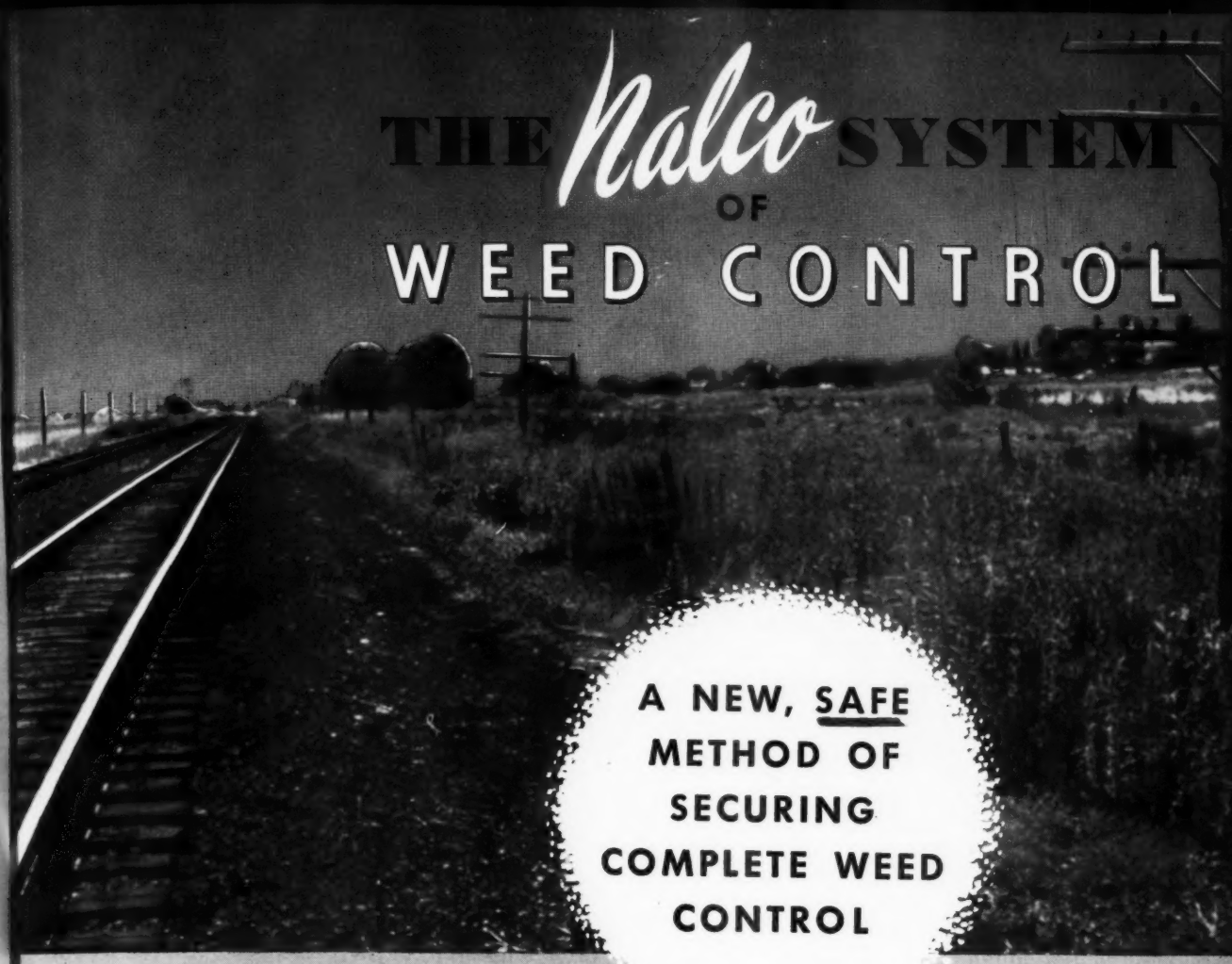

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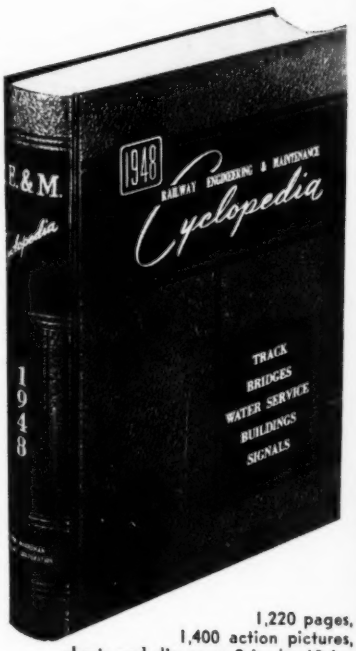

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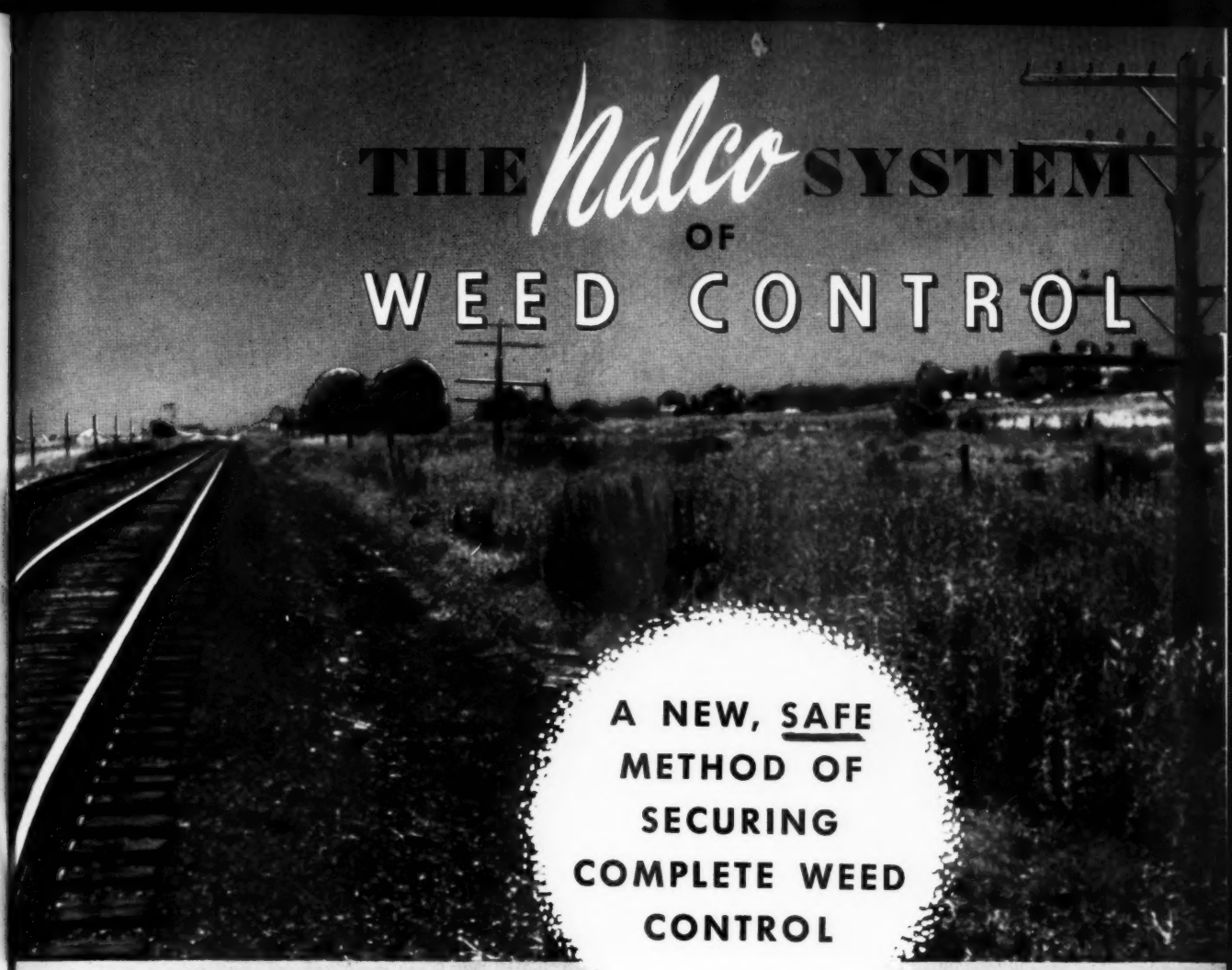

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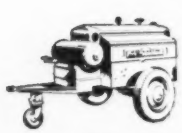

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